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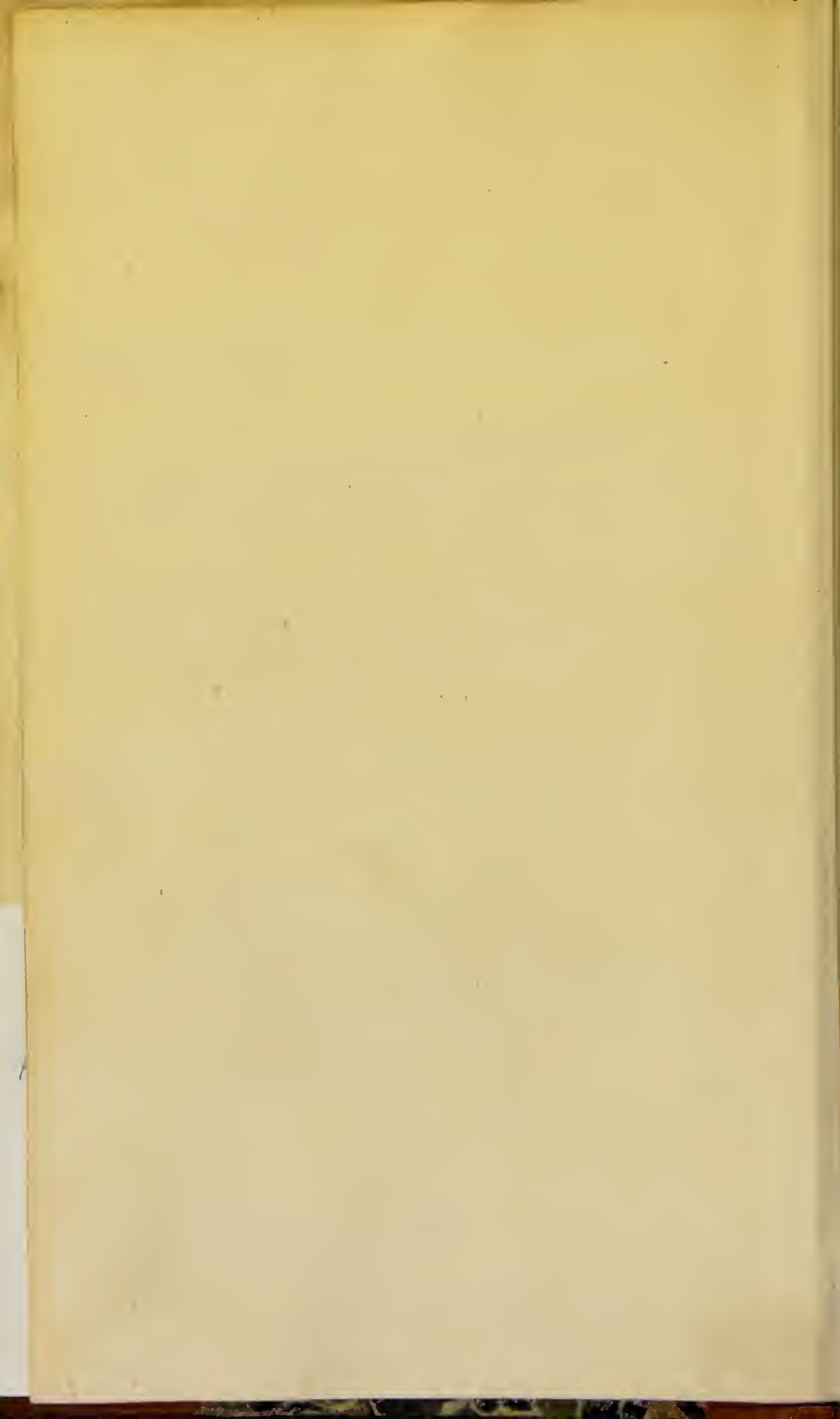


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1926.



AN INQUIRY
INTO THE
NATURE AND ORIGIN
OF
MENTAL DERANGEMENT.
COMPREHENDING
A CONCISE SYSTEM
OF THE
PHYSIOLOGY AND PATHOLOGY
OF THE
HUMAN MIND.
AND A
HISTORY OF THE PASSIONS AND THEIR EFFECTS.



By ALEXANDER CRICHTON, M.D.
PHYSICIAN TO THE WESTMINSTER HOSPITAL, AND PUBLIC
LECTURER ON THE THEORY AND PRACTICE OF
PHYSIC, AND ON CHEMISTRY.

VOLUME I.

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1798.

A.S. 141



TO
DAVID PITCAIRN,
M. D. F. R. S. &c.
WHOSE LEARNING AND TALENTS,
SO CONSPICUOUSLY DISPLAYED
IN THE EXERCISE OF HIS PROFESSION,
HAVE DESERVEDLY RAISED HIM TO
GENERAL REPUTATION AND ESTEEM;
AND
WHOSE LIBERALITY AND LOVE OF SCIENCE
POINT HIM OUT AS AN EXAMPLE
WORTHY OF IMITATION;
THIS WORK
IS
RESPECTFULLY INSCRIBED
BY
HIS MUCH OBLIGED FRIEND,
THE AUTHOR.



P R E F A C E.

THE work which is at present submitted to the judgment of the public, is an attempt to reduce, under certain fixed principles, a number of loose facts, which bound in the writings of medical men, metaphysicians, and philosophers of different ages and of various countries. Many of these facts have been long known, others, from the late period, and foreign languages in which they have been communicated, it is presumed are only partially so; but although they all relate to

VOL. I.

a

disorders

disorders which are common in civilized nations and are daily becoming more frequent, and are universally lamented, as constituting the greatest calamity to which mankind is subject; yet it is generally confessed, that the attempts to throw light on their real nature have been very few, and these few have not been successful.

If we except Dr. ARNOLD, of Leicester, no other author of this country has written fully on the subject of Mental Diseases. Monsieur DUFOUR is the only author, since the time of SAUVAGES, who has written systematically on them in France; and although the German press has sent forth a vast number of publications which relate to diseases of the human mind, yet they are only collections of cases, histories of individual diseases, or accounts of new remedies; for no author of that learned nation, at least as far as my knowledge of their literature extends,

tends, has written either fully or systematically on *Vesaniæ*.

Above six years ago I first formed the design of writing a work on the connection of the mind and body, or rather on the influence which they mutually exert on each other; but after having dedicated all the leisure time I could bestow to the subject for upwards of two years, I discovered what indeed mature reflexion might previously have convinced me of, that I had engaged myself in an almost endless task; for, in order to give it a finished form, it would have been necessary to have described not only all the various changes which the body, both in its healthy and diseased state, undergoes, from the influence of each faculty of the human mind while actively employed, and from the influence of each passion; but it would also have been necessary to have described the various altered and

a 2

morbid

morbid phenomena, which are produced in the mind, by the action and re-action of the body, both in health and under disease: this labour appeared to me, then, to be so much the more unnecessary, as I found the subject had been well treated by a foreign writer of great ingenuity and learning: I mean D. JOHN AUGUSTUS UNZER, in a work, entitled *Erste Grundle eines Physiologie der eigentlichen thierischen Naturthierischer Koerper*. Leipzig, 1771.

Although I was, therefore, obliged to give up my plan, I had proceeded too far in this attractive branch of medical science, and had met with so many uninvestigated objects, that I could not quit the field without making other researches; and, accordingly, I directed all the attention I was able to bestow to the morbid phenomena of the human mind.

About the time I am speaking of I received

ceived from Germany, among a number of works which had been recommended to me by my esteemed and learned friends, Professor BLUMENBACH and Professor ARNEMANN, of the University of Goettingen, one which greatly interested me. It was entitled, *Magazine zum Erfabrungſſee-lenkunde*; which means in English, Magazine of Psychological Experience. This work conſiſts of no leſs than eight volumes, and was firſt publiſhed in numbers under the direction of two learned Psychologiſts, CHARLES PHILIP MORITZ and SALOMON MAIMON. In this work I found what I had not yet met with in any other publication, a number of well-authenticated caſes of insane aberration of mind, narrated in a full and ſatisfactory manner, without a view to any ſyſtem whatever: for the Magazine is almoſt entirely made up of caſes which are ſent to its editors by different hands, and the greateſt part of them are without
much

much comment. It is, indeed, to be lamented, that by far the greatest number of cases contained in this work are uninteresting to the physician. The Germans almost equal ourselves in a fondness for what is wonderful; and it must be confessed, that the *Psychological Magazine* contains a rich and ample stock of materials with which this frail desire may be gratified. The histories of prophetic dreams, surprizing inspirations and warnings, occupy too much of this work; and, independently of these, the long and often tedious relation of the moral sentiments of deaf people, the history of crimes, &c. are for the greater part uninteresting to the physician.

The acquisition of this work, at the very moment that my mind was full of the subject, did not fail, as may be easily imagined, to give fresh vigour to my studies. I extracted these, at first, as
objects

objects of study, and many of them will be met with in the work as illustrations of particular doctrines or assertions.

If I was urged, in the first instance, to the study of this obscure branch of medical science, by a particular bent of mind, and was afterwards excited to proceed in it by the assistance which was thrown in my way, a sense of duty soon joined itself to these motives, and obliged me to direct my whole attention to it. My situation, as a public teacher, rendered it necessary that I should satisfy myself, as to the nature of those things in which I presumed to instruct others. The works which I had perused, on the subject of insanity, did not do so; and I determined therefore, to make it an object of serious thought. How far I have succeeded in throwing more light on the nature of mental diseases, than those have done who have preceded me in this path
of

of knowledge, is not for me to determine. No one who has bestowed less pains on the subject than I have done can be so fully aware of the imperfections of the work. They who first travel into unknown countries seldom foresee all the difficulties they are to encounter; and independently of the difficulties, various other causes of ignorance are met with, for, of the various objects with which these regions abound, some necessarily escape observation, others are often too hastily examined, and some resist examination either from causes which are peculiar to their nature, or from want of proper means for investigation. But, in regard to all these, it is allowable to indulge the hope, that time and experience will not only rectify whatever is erroneous, but also supply whatever is defective.

The method which I have adopted,
throughout

throughout the whole of this work, is that of Analysis. This is the genuine touchstone of truth, not only in matters of external sense, but also in objects of abstract reason; for, as in conducting this mode of inquiry, every constituent or elementary part must be separately examined, it is the surest way of detecting error; and as all complex ideas become clear, in proportion as the individual parts of which they are composed are distinctly represented in the mind, so it is the best mode of establishing well founded results.

In order to conduct analysis with success, much depends on the previous knowledge of the person who conducts it. It is evidently required, that he who undertakes to examine this branch of science in this way, should be acquainted with the human mind in its sane state; and that he should not only be capable of abstracting

abstracting his own mind from himself, and placing it before him, as it were, so as to examine it with the freedom, and with the impartiality of a natural historian; but he also should be able to take a calm and clear view of every cause which tends to affect the healthy operations of mind, and to trace their effects. He should be able to go back to childhood, and see how the mind is modelled by instruction. He who cannot do this will never proceed farther in knowledge than what he has acquired by books or by tuition; and how very limited this knowledge is, in regard to the pathology of the human mind, need not be mentioned.

When the work of analysis is completed, the most useful and difficult part remains; that of applying the result, or general principle, to explain and arrange the individual facts. It is this, indeed, which distinguishes the man of science from

from the mere scholar. It is, of all mental employments, the most difficult, the most liable to error, and yet the most valuable when well accomplished. It is the abridgment of facts and simplification of all knowledge. Experience and observation teach us a vast crowd of facts. We multiply these by analyzing them; in analyzing them we generally obtain a knowledge of the causes of a number of their properties, and often of the cause of their production; and we are thus enabled to reduce a number of effects under a few general principles. Hence the utility of this process. But that it is a process which is often dangerous, and even hurtful to science, must also be admitted. It is dangerous when we try to reduce general principles under principles still more general, or, as it were, to find out the ultimate source of all our knowledge; for where are the facts to guide us in such a research? The ultimate

mate principles are excluded from human research, but, unfortunately, not from human curiosity. It is hurtful to science when a man of genius attempts to reduce the facts of any branch of science under general principles while the facts themselves are too scanty to admit of just conclusions being drawn, for then wild hypotheses must necessarily arise. Let not this observation be construed into an opinion, that hypothesis is useless. There is a period in knowledge when it must be indulged in if we mean to make any progress. It is that period when the facts are too numerous to be recollected without general principles, and yet where the facts are too few to constitute a valid theory. If the exterior form of an edifice is often the principal motive with men for examining its internal structure; so it is in science, that the splendor of an hypothesis, and the desire of proving its solidity, are more frequent motives for research

search than a mere love of knowledge.—
But to return to the explanation of my
plan.

The objects of my inquiry are the
causes of insanity, and the various dis-
eased affections of the human mind, if
such an expression can be admitted. The
order into which I have arranged these,
in consequence of the investigation which
has been instituted, is founded on the
analogy which the causes of mental de-
rangement have with each other. I make
four classes of causes. 1st. Physical or
corporeal causes; 2dly, Over-exertion of
the mental faculties; 3dly, A dispropor-
tionate activity of some of the said facul-
ties; and lastly, The passions, or their in-
fluence.

From this division of the subject arises
the division of my work. It is divided
into three parts or books. In the first
I in-

I inquire into the physical or corporeal causes of delirium and other derangements of mind. In the second, the various morbid changes which each faculty of the human mind is subject to, either from an over-straining, or from an original or acquired disproportionate activity, are investigated; and in the last book I treat of the passions. The reader must excuse me if I dwell a little longer on this plan, since it becomes necessary to do so, in order to point out the reason why certain subjects have been treated which, at first view, might not seem absolutely necessary to the general object of the work.

The physical causes of delirium, such as the corporeal effects of various excesses, excessive heat, sudden transitions of temperature, fevers, certain poisons, &c. necessarily act in a physical manner on the human frame. They produce morbid
alterations

alterations in the living solids, and these generally affect the fluids. Some of the causes of this class operate most powerfully on the heart and arteries and absorbent system, others operate with most force on the brain and nerves; but, in all cases, not only sensation, but the action of the mental faculties are disturbed in consequence of these physical causes. To trace their operation, then, with success, it becomes necessary to be well acquainted with the general offices and properties of the living solids. But as it is probable, that many readers, into whose hands this work may fall, are not fully acquainted with these subjects, I have judged it necessary to begin with the doctrines of Irritability and Sensibility, as explanatory of many of the *data*, on which much of the reasoning that follows is founded; and as containing many axioms to which frequent reference is made. This becomes so much the more necessary, also,

as

as I entertain peculiar notions concerning the manner in which corporeal sensation is carried on, and as the phenomena of many illusions, to which our understanding is exposed, are to be accounted for by these. The remaining chapters of this book require no comment. They follow each other in a natural order, and lead to a general but concise history of the principal phenomena of delirium, and to the establishing of certain fixed notions concerning the immediate or proximate cause.

In the second book I speak of the diseases of each faculty of the human mind, and also of many kinds of general disturbance in our intellectual part, which are occasioned by peculiar faults in the faculties. It is here that I have combined the physiology, or natural history of the mind, with its pathology or morbid history.

GALEN

GALEN justly remarks, “Cujusque morbi tanta est magnitudo quantum a naturali statu recedit, quantum vero recedat, is solus novit qui naturalem habitum ad amissum tenuerit.” This may be said to be particularly true in regard to the diseases of the mind; for, except a student make himself well acquainted with the natural state of each of its faculties, it is impossible for him to know either the approach, progress, or violence of its diseases; and, as a farther inducement for medical men to pay attention to this subject, it may be added, that if they be not well acquainted with the phenomena of mind, both in its natural and diseased state, they will often be subjected to much uneasiness and anxiety when desired to give a decided opinion on many cases of supposed or real mental derangement: for, not being satisfied in their own minds, or rather not knowing how to arrive at a satisfac-

tory conclusion, as to the sanity or insanity of certain individuals, they will remain doubtful and will hesitate what to pronounce, and, consequently, will appear in an inferior light to what men, who are supposed to be masters of their profession, ought to be desirous of appearing in.

Before I finish the remarks I have to offer on this book, I ought to acknowledge, that I have endeavoured to condense the physiological part as much as possible, but I trust that nothing very essential to the physician is omitted.

The third book treats of the passions. Here I have, perhaps, dwelt too much on the physiology of these wonderful affections of our moral part. In this I hope to be excused, not only as very little has hitherto been done, with a view of elucidating their influence on mind and body, but inasmuch as the analysis of the
passions

passions is absolutely necessary to the understanding their peculiar modes of operation.

Such are the motives of my undertaking, and such the plan according to which I have endeavoured to accomplish it. It remains that I should say something of the various works I have consulted.

Among those which I have perused with serious attention is that of the learned Dr. ARNOLD. Like the Psychological Magazine, which I have already mentioned, it contains a sufficient number of facts to build a system on, but I must confess, that to me Dr. ARNOLD's own arrangement is exposed to much criticism; inasmuch as it is intirely founded on a gratuitous distinction between ideas and notions, and on the apparent variety of these which occur in insanity, rather than on the more immediate nature of

the diseases themselves. Dr. A. makes but one genus of insanity; and of this genus he makes several species, which he arranges under two divisions. Mr. LOCK had observed, that all our ideas are either obtained by means of our external senses, or by reflexion; and, accordingly, he says, all our ideas are either ideas of sensation, or ideas of reflexion. Dr. A. chooses to confine the term *ideas* to the first of these, and to the second class he gives the name of *notions*: and as it appears to him, that in the various species of insanity, the disorder exists either in the ideas or in the notions, so he reduces these species, as has been already observed, under two general divisions; the first he calls *Ideal Insanity*, the second *Notional Insanity*. The first is characterized by a delirium, arising from an error in the ideas of a person; the second, by a delirium arising from an error in his notions. Of *Ideal Insanity* he makes the four following species

cies: 1st. Phrenitic; 2d. Incoherent; 3d. Maniacal; 4th. Sensitive.—Of *Notional Insanity* he constitutes nine species: 1st. Delusive; 2d. Fanciful; 3d. Whimsical; 4th. Impulsive; 5th. Scheming; 6th. Vain or Self-important; 7th. Hypochondriacal; 8th. Pathetic; 9th. Appetitive.

Before I attempt to point out the errors in judgment to which this arrangement appears to me to give birth, I cannot avoid taking notice of the singularity, and very unscientific nature of some of the appellations. One might as well pretend to distinguish water from all watery fluids, by the name of *aqueous* water, or wine from other liquors by calling it *vinous*; as to pretend to distinguish one species of insanity from another, by calling it *maniacal* insanity, and another by the name of *phrenitic* insanity, or a third by the name of *incoherent*: for, surely, every maniac is phrenitic, insane, and incoherent,

herent, if these terms are to be taken in the sense in which they are commonly and properly received. The same thing may be observed in regard to many of the terms by which Dr. A. distinguishes the various species of Notional Insanity.

But I would observe, in general, on this grand division of insanity, that it is not founded in nature, although the Doctor very strenuously asserts this. It is, in fact, impossible to reduce the greater number of cases of insanity, which we daily meet with in the course of practice, not only under any of the species which he mentions, but even under the *genera*; for, admitting Dr. A's distinction between *ideas* and *notions*, I will venture to assert, and indeed we need only look into some of the numerous cases, narrated in his work, for the proof, that one and the same insane person shall have both erroneous ideas, and erroneous notions,
in

in which he firmly believes. The greatest objection, however, to this division is this, that it tends to create confusion in the mind, as to the real nature of many of the diseases; thus illusions, which are certainly very distinct kinds of insanity from mania, are, however, brought under the same *genus* with it. Illusions, however, are only to be considered as partial diseases of the human mind, in comparison with mania, for a person who labours under an insane illusion may be able to conduct his affairs, and be able to exercise his judgment as correctly as most men do, except in such matters as have a reference to, or rather association with the objects of his illusion. One faculty only of his mind is morbidly affected, and that only at particular times. But, in mania, the judgment is in opposition to the conviction of every healthy person, in every circumstance which actuates the patient, and all the faculties of
the

the mind are disordered. But what appears still more singular is this; that Dr. A. describes the disease which almost all physicians have agreed to call hypochondriasis, not only as a species of *ideal insanity*, which he chooses to call *sensitive insanity*; but also as a species of *notional insanity*, which he denominates *hypochondriacal insanity*. His definition of sensitive insanity is this.—
“ By sensitive insanity I mean that in
“ which the disorder shews itself chiefly,
“ or remarkably, in the *erroneous images*
“ which are excited in the mind, relative to the person's own *form, substance, or other sensible qualities or contents*; and which are not only contrary
“ to truth, but often inconsistent with
“ the nature of things, and almost always contradictory to the testimony of
“ those about them.” He then proceeds to tell us, that of the patients who labour under this insanity, some imagine them-

themselves to be wolves, others dogs; some lions, cats, cows, cuckoos, nightingales, earthen vessels, pipkins, jars, tea-pots, &c. This, however, is the true character of Hypochondriasis, as will be proved in the body of the present work, and certainly is not elucidated by the place in which Dr. A. has arranged it.

The work of M. DUFOURS is more scientific than that of Dr. ARNOLD, but it is extremely incomplete in what regards the diseases which disturb human reason. Mr. D. is a man who is, evidently, well acquainted with the mind in its natural state, and indeed the greater part of the work is entirely taken up in psychological and physiological disquisition, the only diseases which he describes being idiotism, mania, melancholy, and hypochondriasis. On these subjects he does not bring forward any thing new.

It

It will be evident to those medical readers who have duly studied their profession, that, in consequence of the analysis which I have instituted, many of the diseases which the celebrated SAUVAGES, and SAGAR have given a place to among the mental diseases, are not to be considered as such. In the order Hallucinationes, for instance, I have not admitted any illusions which evidently arise from diseases of the external senses, such as the *Suffusio*, *Diplopia*, *Syrigmus*. As to the order *Morositates*, of SAUVAGES, there is hardly any one of the sixteen species which he mentions, which, in my opinion, have any title to be considered as belonging to the class of *Vesaniæ*, if we except *Nostalgia* and *Panaphobia*, which are mere varieties of melancholy. The arrangements of SIR CHARLES LINNE and VOGEL are subject to more numerous exceptions, which it would be tedious

tedious and unnecessary to repeat, inasmuch as the nosological arrangement of these authors is generally and justly neglected.

Of the authors who, although they have not written expressly on the subject of mental disorders, have yet yielded me much assistance, there is a very long list. The most useful of these authors, and their works, I shall now enumerate, in case others, who choose to write on the same subject, may also wish to go to the fountain head. Those of our British Psychologists, such as LOCK, HARTLEY, REID, PRIESTLEY, STEWART, and KAIMS, need not be mentioned. Of foreign authors, the following are those from whom I have derived most advantage; UNZER, whose work has been already named; FEDER, Professor of Moral Philosophy in the University of Gottingen,

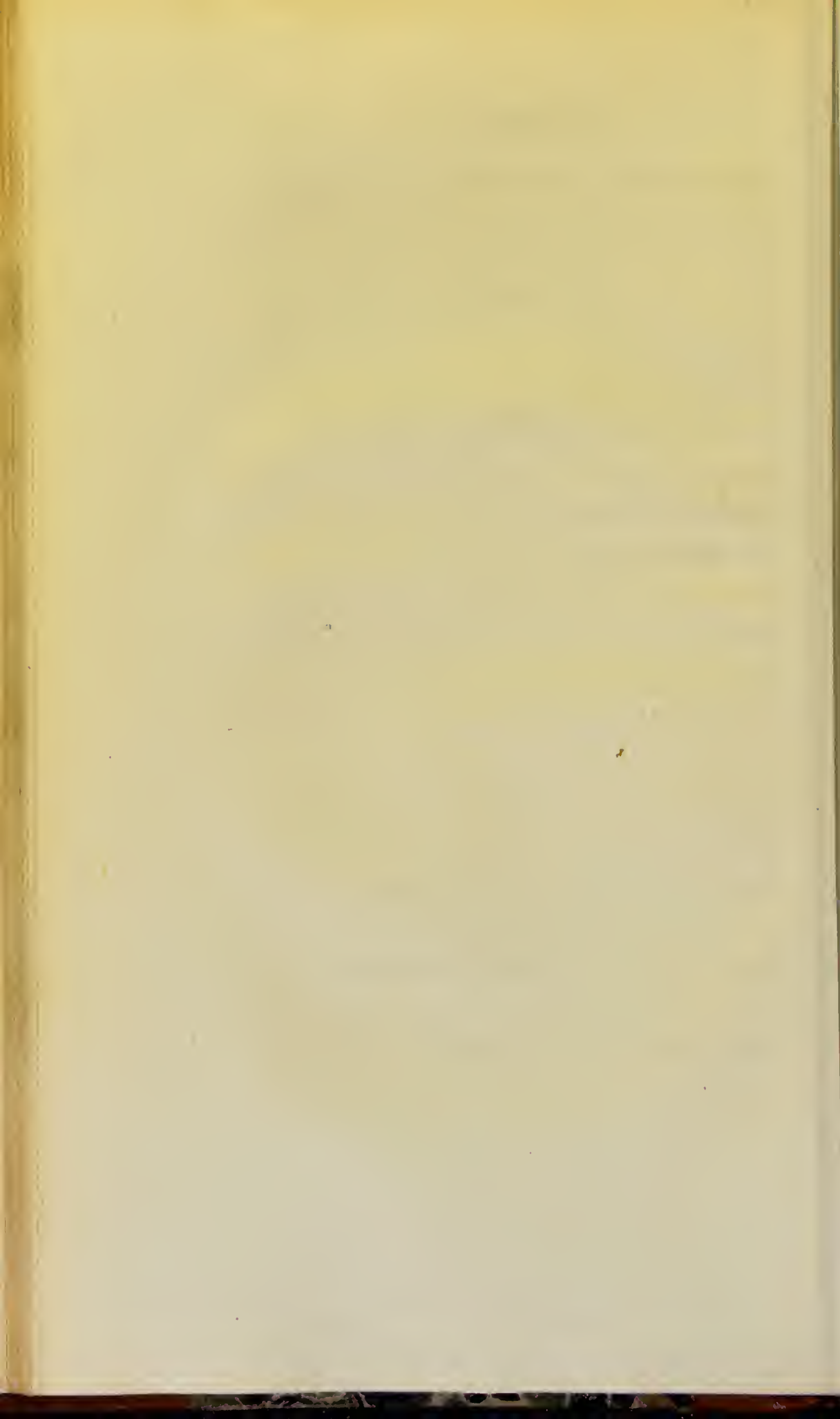
Gottingen, whose excellent work on the Human Will, it is greatly to be lamented, is not translated into English. EWALD, on the Human Heart, (*Ueber das Menschliche Herz*;) an interesting work, which does not appear to be much read even in Germany. SCHMIDT'S *Experimental Seelenlehre*, or *Experimental Psychology*; KRUGER'S ditto; MEIER *Ueber die Gemüthsbewegungen*; HERZ *Ueber den Schwindel*; WEICKHARD'S *Philosophische Arzt*, or *Philosophical Physician*; CONDILLIC'S *Art de Penfer*; TISSOT'S Works on the Nerves, and on the Diseases of Men of Letters.

In regard to the style of this work, I may observe, that the principal quality I have aimed at has been perspicuity. This avowal will sufficiently apologize to the candid critic, for the want of elegance which may appear in several parts of it. A number of inaccurate expressions and
typo-

typographical errors have escaped my observation; as an apology for which, I can only offer the interruption I have met with, during the printing of the work, from my lectures and other professional avocations, joined to the want of practice in this mechanical part of authorship.

SPRING GARDENS,

Jan. 30, 1798.



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B O O K I.

I N Q U I R Y

INTO

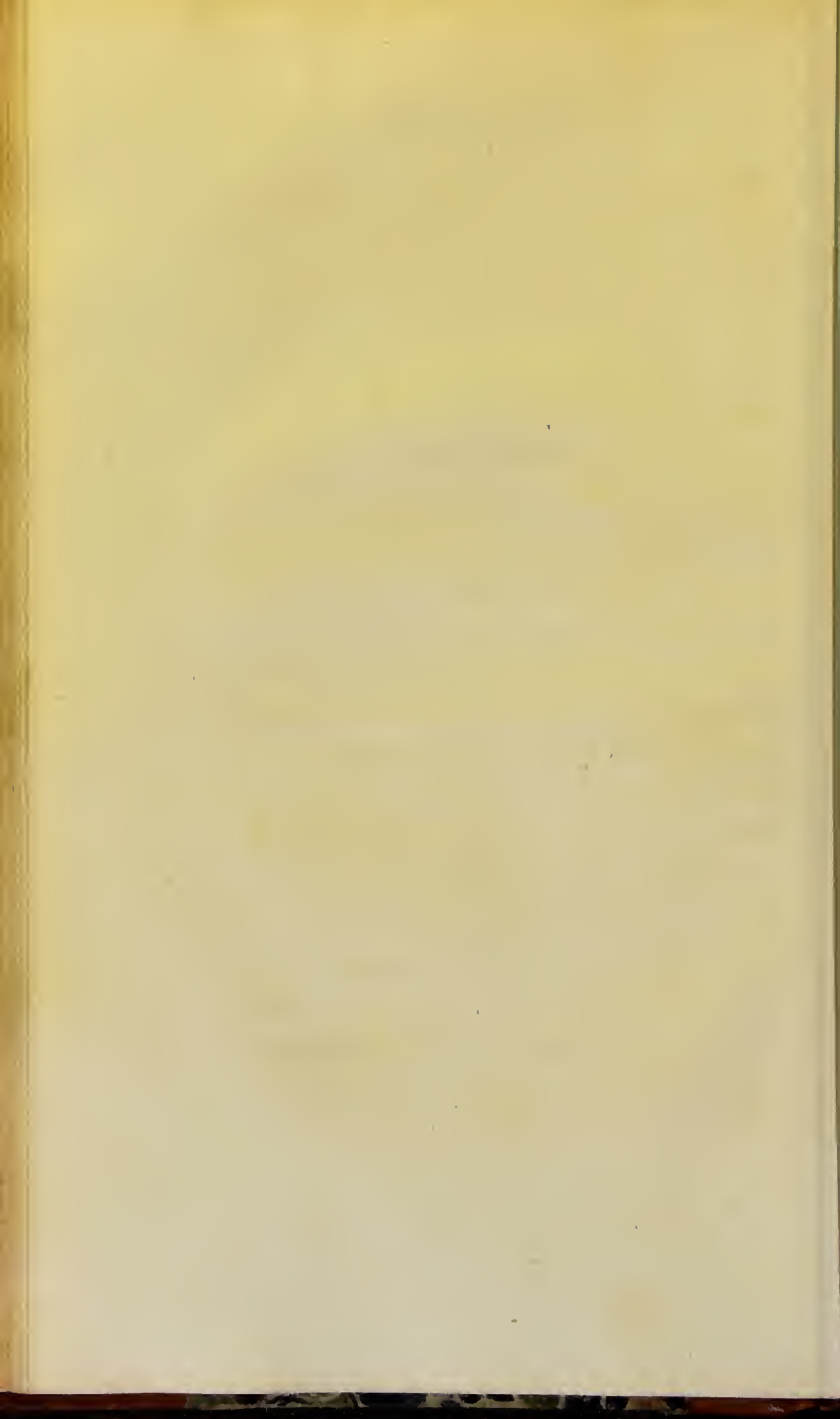
THE PHYSICAL CAUSES

OF

D • E L I R I U M.

VOL. I.

C



ANALYTICAL INQUIRY,

&c.

CHAPTER I.

ON THE PRINCIPLE OF IRRITABILITY AND

ITS LAWS.

AMONG modern physiologists, the very celebrated Baron de HALLER is considered as the first who clearly pointed out the existence of this principle in animal bodies, and proved it to be the cause of muscular motion; yet the merit of the discovery undoubtedly belongs to GLYSSON, who wrote a long time before him.

In GLYSSON'S work, *On the Stomach and Intestines*, a whole chapter is dedicated to the consideration of this subject. It is entitled *De Irritabilitate Fibræ*. He there establishes

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the distinction between the principle of irritability and the nervous energy, and ascribes the action of the heart, and arteries, and the peristaltic motion of the intestines to the influence of the former. "The action of the heart" he says "is neither caused nor altered by sensation. The fibres of the heart, by virtue of the impulse of the vital blood contained in the ventricles, are repeatedly irritated and exerted to contraction and pulsation, and the irritation being quickly removed, they are relaxed and return to their natural position." In another place, he ascribes the convulsive motion into which the muscles of animals are thrown, upon the application of acrid liquors, to this subtle influence; he takes notice that the motion of many muscles continue during sleep, and after decapitation, when all feeling is abolished, and accounts for the phenomena by supposing them to be possessed of irritability. The only thing which renders his doctrine in any degree obscure, and which has probably given rise to the commonly received opinion that his ideas on the subject were not clear, is an expression which
he

he often employs. He makes use of the terms *perception* and *perceptible* to denote that property of the muscles by which they receive the action of a stimulus, and which we express by the word *irritable*: but he takes much pains to establish an accurate distinction between the perception of the nerve, of which he also speaks, and the perception of the irritable fibre, calling the first *perceptio sensitiva*, and the other *perceptio naturalis*. See Appendix No. I.

HALLER prosecuted this subject much further than GLYSSON did, and by the force of the facts on which it was founded, the reputation which he himself enjoyed, and the respect paid to his authority, the hypothesis was soon spread through all the schools of Europe. But it was not received in all of them with equal readiness. It was contended that the principle was the same with that of the nerves, and it was therefore supposed that *muscular* action depended on sensation. The muscles it was imagined, *felt* as it were the stimuli which were applied to them, and it was in consequence of this feeling that they contracted.

GLYSSON and HALLER, and their adherents, were induced to think that there was a *vis insita* in muscles, (irritability): the others contended there was not any *vis insita*, but that muscular motion, as well as feeling, depended entirely on the nervous energy (*vis nervosa*).

It was mentioned as a fact, in favor of this last hypothesis, that muscles were thrown into action equally well when the nerve or nerves leading to these muscles were irritated, as when the stimulus was immediately applied to their own fibres. If it was asked, upon what principle it was to be explained, that the muscles of animals from which the sensorium had been removed by decollation, continued to move for many hours afterwards, as in beheaded frogs, turtles, newtes, &c. it was answered, that in them the nervous power was slowly expended, and that as long as any of it remained in a nerve, so long could the muscles move to which that nerve was sent.

, Leaving

Leaving these objections to be answered by the phenomena of irritability which are immediately to be taken notice of, let it be remarked, that, if in the examination of the question we were to confine our observations to the appearances that occur in perfect animals, we should, perhaps, never arrive at the truth, since in them nervous and muscular matter are intimately blended together in the greater number of irritable parts. The finest needle when thrust into any muscle of a living animal, is acutely felt: how then is it possible to determine whether the phenomena which take place in consequence of the puncture, be owing to a peculiar *vis insita* inherent in them, or to the nervous energy? But in extending our view to the rest of the organized world, such a number of facts present themselves as are sufficient to bring conviction to the mind of any impartial man.

If it can be discovered that there are many organized bodies possessed of a faculty of motion which is totally distinct from that produced by mechanical impulse, or chemical attraction,

traction, inasmuch as it is only peculiar to them during their living state, and that this motion is excited by the application of stimuli; that it follows the same laws with animal motion; is augmented by the application of additional stimuli, and diminished by withdrawing the same, and is evidently affected by the health of the organized body itself; and further, if it be proved that these bodies, possessing such motion, have no brain or nerves, or any thing which has a resemblance to them, then it follows, as a necessary deduction, that there is a principle of motion (irritability, or whatever other name may be given it,) distinct from nervous energy, and also distinct from the principle of mechanical motion.

It is among the vegetables, and lower class of animals, that the organized bodies alluded to are principally to be found. The stamina of the barberry when pricked by a pin, or any other fine sharp instrument, are immediately thrown into evident motion; when the leaves of the *averrhoa carambola* are touched, they draw themselves together; those of the *mimosa pudica*,

pudica, or sensitive plant, do the same thing, either when stimulated by the touch, by electricity, or by ammonia. The leaves of the plant called Venus's fly-trap, (*Dionæa muscipula*) are beset on their edges with sharp prickles: these leaves are endowed with a considerable portion of irritability, for when an insect crawls between them they immediately close themselves, and squeeze the little animal to death. Any person possessed of this rare plant may easily convince himself of its powers; for by irritating the inside of the leaves with a piece of straw, or grass, the motion is immediately produced. The moving plant, (*hedysarum gyrans*) is possessed of evident motion; it is excited by the stimulus of the rays of the sun: for as soon as these fall upon it, its leaflets immediately commence their motion, and when the plant is withdrawn from the solar light, the motion ceases. Many others, besides these already enumerated, are endowed with a faculty of motion in an eminent degree, such as the *oxalis sensitiva*, *onoclea sensibilis*, the *drosera rotundifolia*, and *longifolia*, &c.

These

These facts are adduced with the view of establishing the truth of what was formerly asserted, that there is a faculty of motion distinct from that produced by mechanical causes, and residing in bodies in the structure of which nothing similar to brain or nerves is to be detected. This deduction is further confirmed by the phenomena observed in many of the lower tribes of animals, such as hydatids and polyps, in the organization of which nothing similar to nerve is to be found, and which, however, move and contract when stimulated.

It may be further remarked, in addition to these arguments, that in perfect animals the irritability of a part is never in proportion to its sensibility, which, however, might be reasonably expected if the energy were the same in both parts, or, in other words, if muscular motion was owing to the same cause as sensation. It is a fact established by repeated observations, that the heart has very little sensibility, and yet is endowed with an uncommon faculty of motion. I have seen the iris wounded several times in the operation
for

for extracting the cataract, yet I never observed the patient even to wince, or utter any ejaculation expressive of pain. There is not, however, a part of the body possessed of more irritability than this. Although the sensation of a palsied limb be often almost totally abolished, yet the muscles retain their irritability and faculty of motion. In such cases the nerves which go to the muscles, are so diseased or compressed that they do not transmit the impressions of the will, but if a topical stimulus be applied to them, such as a shock of electricity, they are immediately made to contract. The arteries of a paralytic limb also continue to act as usual, notwithstanding the diminution of the nervous influence.

If all these various facts and observations be impartially considered, it will be allowed that it is a fair deduction to conclude that the principle of irritability is distinct in itself from the nervous principle; and when the phenomena of the brain and nerves are explained, this will appear in a still more striking light.

In

In the human body almost all irritable parts are of a muscular structure, such for instance as the heart and arteries, stomach and intestines, bladder and ureters, &c. and hence it is believed, that no part can be irritable which is not fibrous; and hence another conclusion, that there is a peculiar fibre, *the irritable fibre*, which composes the fabric of muscles. This opinion prevails much at present. It is imagined that every irritable part is of a muscular structure, and many physiologists go so far as to speak of the muscles of plants, nay some assert that they have detected them. That all muscular parts are irritable, I believe to be a fair and just conclusion, to which no fact can be opposed; but to extend the position, and assert that all irritable bodies and irritable parts of bodies are muscular and fibrous, I consider as an error founded on the narrow basis of a few facts, but which want the support of various others in order to be confirmed.

There are many of the fresh water polypi, (animals possessing the faculty of motion in a
very

very remarkable degree,) the structure of which can be easily discerned by means of a good lens, or microscope. In them nothing similar to a fibrous texture is to be seen. Their tender bodies are formed of a congeries of gelatinous points like boiled sago, and this is enveloped in a fine membrane. Here, then, there is nothing similar to fibre, and yet there is not an animal more irritable. In the human body itself we have two parts (the iris and uterus) remarkable for their irritability, in which nothing similar to muscular structure is to be discovered. We must therefore in candour allow that if irritability be connected with any peculiar structure, we are quite ignorant what that peculiar structure is.

The phenomena of irritable bodies, or irritable parts of bodies, are extremely various, and differ according to the purposes for which they have been formed. There appear to be certain fixed laws which regulate all these phenomena. These laws are general, and therefore common to every irritable body whatever.

The

The very celebrated FONTANA is the first, as far as my reading goes, who has attempted to generalize the phenomena of irritable parts. In the first volume of his *Fisica Animale*, a work which it is to be lamented he has not finished, he has reduced them under five general laws, (see Appendix, No. 2.) but as his observations at the time he wrote, were chiefly directed to animals, he has called them laws of muscular motion. The same subject has of late been still more generalized by an ingenious gentleman, Dr. GIRTANNER, who in an excellent essay, published in the *Journal de Physique*, for 1790, has clearly shewn the analogy between the irritability of the vegetable and the animal kingdom, and by modifying the axioms of FONTANA, has made them applicable to the phenomena of the motions of all organized bodies whatever. In this essay he has gone a step farther, for he has attempted to establish a theory concerning the nature of irritability. This theory will be examined in its proper place. The laws of irritability which follow are partly new axioms, partly modifications of those of FONTANA and GIRTANNER.

AXIOM I,

AXIOM I. *After every action in an irritable part, a state of rest, or cessation from motion, must take place before the irritable part can be again incited to action.*

If, by an effort of volition, we throw any of our muscles into action, that action can only be continued for a certain space of time; the muscle becomes relaxed, notwithstanding all our endeavours to the contrary, and remains a certain time in that relaxed state before it can be again thrown into action. After every contraction of an artery a relaxation follows; although the stimulus which incites it to action (the blood) be constantly applied to its internal surface. After every contraction of the muscular coat of the stomach, or of the intestines, the same event takes place.

In the vegetable kingdom we find the irritability regulated by the same law. Although the rays of the sun constantly act for some hours on the leaves of the *hedyсарum gyrans*, yet their motions are always interrupted by short states of rest.

AXIOM II.

AXIOM II. *Each irritable part has a certain portion or quantity of the principle of irritability, which is natural to it, part of which it loses during action, or from the application of stimuli.*

AXIOM III. *By a process wholly unknown to us it regains this lost quantity during its repose, or state of rest.*

In order to express the different quantities of irritability in any part, we say that it is either more or less redundant, or more or less defective. It becomes redundant in a part when the stimuli which are calculated to act on that part are withdrawn, or withheld for a certain length of time, because then no action can take place; while on the other hand the application of stimuli causes it to be exhausted, or to be deficient, not only by exciting action, but by some secret influence, the nature of which has not yet been detected; for it is a circumstance extremely deserving of attention, that an irritable part, or body, may be suddenly deprived of its irritability by powerful stimuli, and yet no apparent increase of muscular or vascular action take place at the time. A cer-
tain

tain quantity of spirits taken at once into the stomach, kills almost as instantaneously as lightning does: the same thing may be observed of some poisons, as opium. If a large dose of distilled laurel water be given to an animal, it instantly deprives the whole muscular parts, and indeed the whole frame, of its irritability; it destroys life without any previous evident increased action of the heart and arterial system. There is another poison of the vegetable kind, the fatal influence of which is almost as quick as that of lightning, and which suddenly exhausts the whole irritability of the system, without producing any evident violent action in the heart and arteries, or other irritable parts of the animal. It is the juice of the *cerbera alouai*, a poison with which the South Americans impregnate their arrows. But in order that it may produce its deleterious effects, it must be applied to a wound. The slightest puncture is sufficient for the purpose. My very ingenious and esteemed friend, Professor BLUMENBACH, of the university of Göttingen, related to me the following experiment, which he made with this poison. He took

took a young puppy, and having slightly scratched the tip of its ear with a needle, he applied to the wounded part a little of the dried juice of the cerbera arovai, which he scraped from an arrow. Scarcely had he time to lay the little animal on the ground when it was seized with a convulsion, and instantly died. The muscles were quite flabby after death, and the blood did not coagulate.

A vast variety of natural and diseased actions of irritable bodies are explained by the application of the second and third laws of irritability. The celebrated SENAC, and Professor WEITBRECHT, of Goettingen, were of opinion that all muscular motion depended on the vis nervosa of these parts, and not on any distinct principle, any vis insita in them. They objected to HALLER's explanation of the phenomena of circulation by the doctrine of irritability, that if the heart contracted solely from the stimulus of the blood, it ought always to be in a state of contraction; for they proved by experiment that the auricles and ventricles of the heart were never completely empty.

Or

Or if it did not always contract, it ought at least to have done so before the cavities were half filled, since there was present a sufficient stimulus to act on the whole internal surface. This objection seems to have occasioned considerable embarrassment to HALLER, for he never answered it in a satisfactory manner. Professor WHYTT, of Edinburgh, although of a contrary opinion to HALLER, inasmuch as he considered the motion of the heart to proceed from an irritation of its nerves, and not from any affection of a *vis insita*, yet as he imagined the objection militated equally against his doctrine, answered it by saying that a certain degree of distention was necessary to produce the irritation of the nerves, and that until this degree of distention took place, no motion could ensue. If this were to be admitted as a principle, it must hold good in every analogous case. But we know from the observations of FONTANA, that in eels, turtles, snails, and some other animals, the heart remains completely distended with blood for some seconds before it contracts. If distention, therefore, were the only circumstance which produces the motion of the heart,

here would be a cause operating without an effect, and under circumstances favourable for such an event.

The way in which the difficulty is at present explained, is by supposing, that a portion of the irritability of the heart is exhausted by each action, and that a certain state of quiescence is necessary before that principle can be again accumulated in the part, in sufficient quantity to be acted on. This state of rest in the heart and arteries is the interval between the pulsations, and in these organs is only of a few seconds duration.

There is a considerable limitation to this law; for if an irritable part be kept too long in a state of inaction, or if its habitual stimuli be too long withheld from it, it loses its irritability, or, to speak more correctly, it ceases to form any. This will be explained more fully afterwards.

AXIOM IV. *Each irritable part has stimuli which are peculiar to it; and which are intended to support its natural action.*

The

The greater number of animals both cold and warm blooded, are to be considered under two points of view; in regard to the present subject.

1. Each irritable part of an animal, such as its heart, stomach, gall-bladder, arteries, absorbents, muscles, &c. is to be considered as a distinct irritable body, having a susceptibility of being acted on by certain stimuli, which in these parts preserve a healthy action, but which if applied to others would produce an irregular one, and consequent disease; thus the blood is the natural stimulus to the heart, arteries, and veins; but if this fluid by any accident gets into the stomach, it produces sickness and vomiting, acting as a powerful stimulus to that viscus. If the gall, which is the natural stimulus to the gall-bladder, ducts, and duodenum, is by any accident effused into the cavity of the peritoneum, it excites too great action in the vessels of that part, and induces inflammation. The urine does not irritate the tender fabric of the kidneys, ureters, or bladder, except in such a degree as to pre-

serve their healthy action ; but if it be effused into the cellular membrane, it brings on such violent action of the vessels of these parts as to produce gangrene. Such stimuli are called *habitual stimuli* of parts.

2. All the irritable parts of animals are to be considered as forming one general system, connected by a particular contrivance, by means of which the influence of certain stimuli, although only local in their application, is diffused throughout the whole body. The connecting medium alluded to is the brain and nervous system. There is no irritable part of the human body whatever, into the structure of which some fibres of nerves do not enter, and by their means, therefore, various impressions are transmitted to them from distant places ; thus the impressions of various desires cause the whole muscular system to be increased in action. Heat, although only applied to the skin, does the same thing ; wine or spirits in moderate quantity, although only applied to the stomach, do the same thing also.

AXIOM V.

AXIOM V. *Each irritable part differs from the rest in regard to the quantity of irritability which it possesses.*

This law explains to us the reason of that great diversity which we observe in the action of various irritable parts; thus the muscles of voluntary motion can remain a long time in a state of action, and if it be continued as long as possible, another considerable portion of time is required before they regain the irritability they lost; but the heart and arteries have a short and sudden action, and their state of quiescence or rest is equally so; the circular muscles of the intestines have also a quick action and short rest. The urinary bladder does not fully regain the irritability it loses, during its contraction, for a considerable space of time; the vessels which separate and throw out the menstrual discharge, act in general for three or four days, and do not regain the irritability they lose for a lunar month.

AXIOM VI. *All stimuli produce action in proportion to their irritating powers.*

All

All our varieties of food, from the simplest and mildest vegetables, to the most compound aromatic dishes, all our drinks, from water to the strongest spirits, all gradation of heat, from the cold of the poles to the scorching rays of a tropical sun, are regulated by this law in their primary action, not only on the human, but also on every body possessed of irritability.

As a person approaches his hand to the fire the action of all the vessels of the skin is increased, and it glows with heat; if the hand be approached still nearer, the action is increased to such an unusual degree as to occasion redness and pain; and if it be continued too long, real inflammation takes place; but if this heat be continued, the part at last loses its irritability, and a sphacelus, or gangrene ensues.

When an animal which is capable of sustaining great extremes of heat and cold, is observed with attention, it will be found that the quickness of circulation is always proportioned

tioned to the degree of heat. The heart of hamster beats 100 in a minute during the heats of summer: in winter it beats only 15 in a minute. See *Versuch einer natürlichen Geschichte des Hamsters* durch F. G. SULZER. Göttingen und Gotha, 1774.

AXIOM VII. *The action of every stimulus is in an inverse ratio to the frequency of its application.*

In applying this law in its utmost extent to the explanation of certain phenomena in irritable bodies, it must be recollected that each irritable part has a quantity of the principle of irritability natural to it; and it is also to be observed, that many parts lose their irritability much more quickly than others.

This law, then, explains several phenomena, remarkable in particular habits, which attend the use of stimuli. A small quantity of spirits taken into the stomach increases the action of its muscular coat, and also of its various vessels, so that digestion is thereby facilitated. If the same quantity, however, be taken frequently,

quently, it loses its effect. In order to produce the same effects as at first, a larger quantity is necessary, and hence the origin of dram drinking. A small portion of tobacco when first taken into the mouth, stimulates the duct of the parotid gland, and also the gland itself, increasing the flow of saliva; but if this quantity be daily chewed, it gradually loses its effects, and large mouthfuls must be taken. The same theory holds good with regard to various medicines of the tonic and stimulant kind, which it would be entirely out of place at present to mention.

AXIOM VIII. *The more the irritability of a part is accumulated, the more that part is disposed to be acted upon.*

It is on this account that the activity of all animals, while in perfect health, is much livelier in the morning than at any other time of the day; for during the night the irritability of the whole frame, and especially that of the muscles destined for labour, viz. the muscles of voluntary action, is re-accumulated. The
same

same law explains why digestion goes on more rapidly the first hour after food is swallowed, than at any other time, and it also accounts for the great danger that accrues to a famished person upon first taking in food.

The general effects of all food are principally to be considered,

1. As topical stimuli to the stomach and intestines.

2. As general stimuli, acting through the medium of the nerves.

3. As materials repairing the waste which is constantly taking place in that stimulus (the blood) which supports the action of the heart and arteries.

The food is the stimulus therefore which excites the healthy action of the muscular coat of the stomach and intestines, the action of the vessels which secrete the gastric fluid, and
which

which keeps up the action indirectly of the whole sanguiferous system.

When food is withdrawn it is evident that the action of all these parts must be diminished, and the irritability of course accumulated especially in the sanguiferous system. If, therefore, a person who has sustained hunger for a great length of time eats incautiously, and swallows quickly, it has the same effect upon him as the drinking too large a quantity of spirits has on a person who has not been accustomed to take them except in a moderate quantity, that is, it rapidly exhausts the irritability of his frame; and hence we have many instances on record of people dying from such an imprudent conduct. In the second volume of the Memoirs of the Philosophical Society of Manchester, there is a case related which is highly illustrative of this fact. The circumstances are shortly these. Part of a coal pit fell in, and one of the colliers was thereby confined in one of the galleries of the mine. His companions did not discover him till the eighth day after the accident. When they reached

reached him he was lying on his belly, in a cavity which he had been digging. He was still alive, and addressed one of his companions by name, and asked for something to drink. That which was given him was exactly the most proper thing which could have been thought of, a little gruel every ten or fifteen minutes. It was not until the following day that they got him home, as they were obliged to dig a passage for his conveyance; as soon as he got home he was put to bed, covered, and fed with chicken broth, soon after which his pulse began to grow quick, and he expired without a struggle.—Such are the circumstances of the case. It appears probable that in this case the external heat did the most injury. If he had continued a day or two longer in the mine, or had not been brought into a warm room and warm bed, there is reason to believe he might have recovered, for it is evident that he was doing well during the whole of the first day that his companions discovered him.

A medical

A medical gentleman, a friend of mine, who had been afflicted with various dyspeptic complaints, and imagined they were to be remedied by abstemious living, accustomed himself for some time to eat only such diet as afforded little nourishment, and which was easily digested, such as gruel, boiled rice, &c. By this means his organs of digestion seemed to recover their former strength, his dyspeptic symptoms disappeared, and he now deemed it unnecessary to continue any longer in the same rigid plan. Accordingly he returned to his former way of living, but after the first full meal he took, he was seized with an inflammation of the bowels.

If one of the natural stimuli which keeps up the circulation of the blood in a vascular part be diminished, the irritability of that part is accumulated, and disposes the vessels to excessive action; and hence chilblains, ophthalmias, and inflamed tonsils, are extremely common at those seasons of the year when transitions from cold to heat are most frequent, or when people come from a cold atmosphere into warm rooms.

It

It may be remarked that almost all the cases of inflammation of the lungs or stomach to which the common people of London are subject, arise from similar causes. Either they have been riding in carts, or on the tops of coaches, in very cold weather, and afterwards have come into a warm room, probably an alehouse; or else they have been working for hours in drains, or in similar cold situations. While they remain in the cold, no symptoms of the disorder occur. It almost always commences when they get home.

If external heat be so much diminished as to cause the circulation of blood in a part to be almost totally stopt, great danger will arise if the part be then suddenly exposed to too warm a temperature, for such a degree of inflammation occurs in these instances, as causes a gangrene to ensue. Hence the best cure for a frost-bitten part is the common application of melting snow, or cold water. Similar facts to these are to be discovered in the vegetable kingdom: a plant that has been reared in a very poor soil is like a person half famished.

If

If it be immediately transplanted into a richer soil it soon dies. A plant that has been reared in a cold temperature if brought into a hot-house, or very warm apartment, grows rapidly for a short while, but soon dies.

AXIOM IX. *If the stimuli which keep up the action of any irritable body be withdrawn for too great a length of time, that process on which the formation of the principle depends is gradually diminished, and at last intirely destroyed.*

In the comment on the third axiom, which expresses that a certain degree of quiescence from action is necessary to repair the irritability, it was mentioned that the axiom was to be understood as being true only under certain limitations. The principle of irritability is not to be considered as a mere quality, but as a fine subtle kind of matter, secreted from certain vessels; or if not secreted, at least formed by some occult action of living bodies. It is evident that it depends on the circulation of the blood; for its formation, *ceteris paribus*, is more or less quick as the animal is more

or

or less vigorous. Not only the healthy action of the heart and arteries, but a certain proportion and texture of the blood itself, is necessary to its formation. Whatever diminishes the healthy action of the vascular system, and the due quantity of fluids, must necessarily prevent the formation of a proper quantity of this principle. But all general stimuli operate directly or indirectly, either in causing a proper supply of chyle and blood, or in preserving the action of the heart and arteries; and therefore the diminution of these, or the total abstraction of them, may occasion either a direct debility, or death itself. When the irritability of the system is too quickly exhausted by heat, as is the case in certain warm climates, the application of cold invigorates the frame, because cold is a mere diminution of the overplus of that stimulus which was causing the rapid consumption of the principle. Under such or similar circumstances, therefore, cold is a tonic remedy, but if in a climate naturally cold, a person were to go into a cold bath, and not soon return into the warmer atmosphere, it would

would destroy life just in the same manner as many poor people who have no comfortable dwellings are often destroyed from being too long exposed to the cold in winter. Upon the first application of cold the irritability is accumulated, and the vascular system therefore is disposed to great action ; but after a certain time, all action is so much diminished that the process, whatever it be, on which the formation of the irritable principle depends, is entirely lost. When a person, after having ate a full meal, fasts for several hours, he is thereby disposed for every healthy action ; for there is then a sufficient quantity of materials yielded to the system to repair its waste, and the temporary abstinence from food, as it allows the irritability to be accumulated, causes the augmented volume of blood to act more powerfully than it would do were the irritability exhausted by any general stimulus applied to the stomach. Drinkers of spirits, and the inhabitants of warm climates, are generally emaciated and weak ; for independently of other causes, the irritability which ought to be expended in forming good chyle, and good blood, and in disposing of these materials,

materials, is wasted by such excessive stimuli. Hence, also, those who eat too frequently, and too much, are liable to various disorders, and debility; such as a faulty secretion of gastric fluid, a faulty action of the muscular coat of the stomach, generation of air in the stomach, faulty secretion of pancreatic liquor, faulty secretion of bile, enlargement of the liver, of the mesenteric glands, palsy, &c. When these primary affections continue long, they produce various others sympathetically, such as headach, vertigo, apoplexy, &c.

Debility and death, then, may be produced by the too frequent use of stimulants, or by taking at once too large a quantity of any powerful one. To debility thus occasioned, a late eccentric genius in medicine (Dr. JOHN BROWN) gave the name of *indirect debility*, and from a want of enlarged views on the subject of his profession, he generalized his ideas of direct and indirect debility so far as to make them the principles of explaining, according to his notions, not only the origin and nature of all diseases, but also the action of all medicines. The doctrine of direct and

indirect debility is doubtless true to a certain extent, and explains many phenomena of diseases ; it has also modified and ameliorated practice in several points ; but to make it the basis of a general classification of disorders, to attempt to explain all their phenomena by it, and above all, to make it the only foundation of the indications of cure, betrays a singular incapacity for comprehensive observation, and a radical defect of medical science.

The general laws agreeable to which irritability seems to be regulated in producing its various phenomena, having been described, a question of great intricacy now arises for discussion : What is the nature of this principle ?

Until of late no opinion whatever was offered on this subject, except by those who considered irritability and the nervous principle as one and the same thing. Many conjectures have been formed concerning the nature of this last mentioned influence. Some have thought it to be electricity ; others the magnetic fluid ; others what they call æther ;
others

others a fluid *sui generis*. As the examination of these hypotheses belongs to the subject of Sensation, it will be more agreeable to method to defer it until that subject is itself investigated.

Of late a new doctrine has arisen, which has been dignified with the respectable title of a theory. The proofs of its truth, however, are so scanty, and so many facts remain unexplained by it, that it cannot be allowed such an honour. Dr. GIRTANNER is the first who considers irritability to be nothing else than oxygene; the basis of pure air. This opinion has been adopted by Dr. BEDDOES, and a few other pneumatic doctors.

In examining this hypothesis, it is impossible for any one who has a just sense of the value of candour in another, not to be hurt by the manner in which Dr. GIRTANNER conceals discoveries that have been made, and conjectures that have been offered to the public long before he wrote. There is a species of egotism in some authors which is so powerful as to make them hide not only the sources from which

they borrow their ideas, but often to ascribe to themselves the merit of discoveries to which they have no kind of claim. The opinions of their opponents, when easily combated, are all brought forward, because the refutation of these adds to their glory; but the combats of others who have fought successfully before them in the same field are not mentioned, for fear that their fame should suffer diminution. Such a conduct must necessarily occasion disgust, a sentiment always unfavourable to a writer, however great his talents may be, for it prevents our doing him that justice to which he is otherwise justly entitled.

“ I think ” says Dr. G. “ that the oxygene
“ is absorbed by the blood, and that the
“ venous blood is oxygenated in the lungs
“ during respiration. The most celebrated
“ naturalists, and chemists, are of a different
“ opinion; they think that the oxygene does
“ not combine with the venous blood. Ac-
“ cording to them, this last loses carbon and
“ hydrogen, and recovers the bright colour
“ natural to it, without absorbing any thing
“ from the atmosphere.”

In

In another part he says, “ After having a
“ long time attended to the phenomena of
“ respiration, and made many experiments
“ upon this subject, I think it may be con-
“ cluded, that during respiration one part of
“ the oxygene of the vital air combines with
“ the venous blood, of which it changes the
“ black colour, and makes it vermillion.”

These conclusions had been made by Dr. GODWIN, in his theses *on respiration*, a considerable time before Dr. GIRTANNER wrote. He mentions many beautiful experiments, by which the opinion is proved to be true.

The conjecture that oxygene is the principle of irritability, is peculiar to Dr. GIRTANNER. Whether it be true or false, he has the merit of having first mentioned it.

Before any remarks be offered on this *theory*, as Dr. G. calls it (*a*), it appears but just to
place

(*a*) Among medical students, nothing is more common than to apply the word *theory* to every idle speculation
which

place it in the most favourable light, and to bring forward the proofs on which it is founded; and as no person will probably ever do this more advantageously than the author himself, his own expressions are adopted. “ The irritability of organized bodies is al-

which presents itself to their fancy; but it is a lamentable circumstance to see a gentleman well versed in literature and in science, and who writes an elegant and perspicuous language, abuse abstract terms so very egregiously.

As this work is chiefly intended for the younger part of medical men, and as the distinction between theory and hypothesis may not be familiar to them, it may be remarked, that the former term ought only to be applied to such a system of general rules as is intirely founded on experience, and which explains every phenomenon belonging to that branch of science to which it refers. An hypothesis, on the other hand, is a system of general rules, founded partly on fact, partly on conjecture. A theory explains every fact; an hypothesis explains only a certain number of facts, leaving some unaccounted for, and others in opposition to it. There is not, either in medicine or chemistry, even in their improved state, any system of general rules, or principles, which is intitled to the denomination of theory. Doubt always precedes truth: hypothesis prepares the way for theory;—hence the utility of this last in science.

“ ways

“ ways in a direct ratio of the quantity of
“ oxygene they contain.”

1. “ Every thing that increafes the quantity
“ of oxygene in organized bodies, increafes at
“ the fame time their irritability.”

“ We have feen a direct proof of this in the
“ 3d experiment cited above. Besides this, a
“ great number of other phenomena fupport my
“ opinion. The irritability of animals made to
“ breathe oxygene air is wonderfully increafed.
“ Blanched plants, whose irritability has been
“ accumulated in confequence of the abftraction
“ of the ftimulus of light, contain a great quan-
“ tity of oxygene, according to the experiments
“ of Mr. FOURCROY. I have obferved in the
“ courfe of my experiments, that plants made to
“ grow in oxygene air became white, although
“ expofed to the light. But what fhews more
“ clearly than all, that the irritability is in pro-
“ portion to the quantity of oxygene, are the
“ phenomena attending the action of mercuri-
“ and mercurial falts upon animals. As this is
“ one of the moft ftriking proofs of my theory,
“ and

“ and as I have before observed, that many per-
“ sons, and among the rest, philosophers of the
“ first rank, such as Dr. CRAWFORD, have been
“ struck with the novelty and simplicity of my
“ mode of explaining these phenomena, I can-
“ not forbear entering into some detail upon this
“ subject. It is a well known fact among phy-
“ sicians, that mercury, in its metallic state, has
“ no effect on the human body. I have known
“ many people who for many years took a daily
“ portion of quicksilver, to the amount of one
“ or two ounces, from an idea of guarding
“ themselves from epidemic diseases, but who
“ never perceived any effect whatever from this
“ singular custom. It is proved by Dr. SAUN-
“ DERS, that the effects of mercurial ointment
“ are owing only to the small quantity of mer-
“ cury that has been oxidated during a long tri-
“ turation. It is necessary, therefore, that mer-
“ cury should be oxidated to have any effect
“ upon the human body. On the other hand it
“ is well known that in persons who have taken
“ the oxide of mercury, the mercury after
“ having produced its usual effects, has passed
“ through the skin in a metallic form, and has
“ amalgamated

“ amalgamated itself with watches, and the gold
“ in the pocket, &c. The oxide of mercury in
“ passing through the human body, parts with
“ its oxygene, and it is to this oxygene alone,
“ which remains combined with the system that
“ the effect produced by oxidated mercury is
“ owing. This effect is the mercurial disease,
“ the symptoms of which are the same as those
“ of the scurvy; the mouth, gums, and the
“ whole system are affected in a manner ex-
“ tremely analogous. But the scurvy, as I have
“ proved in my first essay, is a disease produced
“ by the accumulation of the irritable prin-
“ ciple. The accumulation, therefore, of the
“ oxygene producing the same effects, the great
“ analogy between the irritable principle and
“ oxygene appears to be proved; and I think
“ myself authorized to conclude that oxygene
“ is the principle of irritability.”

In the above citation, Dr. GIRTANNER's opinion is clearly stated, and the chief arguments on which it is founded are mentioned. The force of the conclusion is chiefly supported by the idea that the scurvy is a disease of accumulated

mulated irritability, or in other words, a disease in which the body is too highly oxygenated; for it is owing to the great analogy which Dr. G. thinks he discovers between scurvy and the effects of mercury, that he concludes that the mercurial disease is also a disease of super-oxygenation.

As I mean to contend with Dr. BEDDOES that scurvy, so far from being a disease of super-oxygenation, is one in which the blood is not sufficiently oxygenated, it may be thought right to adduce, in the first place, those circumstances which Dr. G. considers as proofs in favour of his opinion.

“ By the abstraction of many of the com-
“ mon stimuli, for any length of time, the
“ irritability of the fibre accumulates so much,
“ that the most trifling stimulus produces the
“ most violent effects, and frequently, even
“ instantaneous death. This disease is called
“ the scurvy, concerning the nature of which,
“ medical men have formed so many false and
“ ridiculous theories. It is of the utmost im-
“ portance

“ portance to mankind to know the true nature
“ of the disease ; since, in consequence of our
“ ignorance in this particular, we have been
“ unable to find a sure remedy for it, and so
“ many thousands of lives have fallen a sacri-
“ fice to its ravages, in armies, fleets, and
“ besieged towns. In the last war the English
“ fleet suffered dreadfully from the scurvy :
“ and last year a great number of soldiers died
“ of this disease in the Imperial army in
“ Wallachia, in consequence of the abstraction
“ of nutriment (the emperor having ordered
“ that a kind of paste, made of bread and
“ water, should be given to the soldiers instead
“ of meat) of the stimulus of oxygene, in the
“ corrupted atmosphere of the fens of Walla-
“ chia, and lastly, of the nervous stimulus,
“ the most powerful of all ; for the greatest
“ part of the army were engaged by force,
“ and against their will.

“ The abstraction of all these stimuli accu-
“ mulated the irritability of the fibre, and
“ caused the scurvy, and that dreadful mor-
“ tality that took place in the army.” See
the

the translation of GIRTANNER's Essay in BEDDOES' work on Calculus)

To reason thus on the nature of a disease, from a preconceived notion concerning the manner in which its remote causes produce their effects, is by no means uncommon in the annals of medicine, although certainly not agreeable to the spirit of philosophical inquiry. If the phenomena of the disease itself, instead of being accounted for by such an hypothesis, stand in direct contradiction to it, and the mode of cure be found to consist in exhibiting remedies which abound with the very materials which are supposed to produce the disorder; these are sufficient arguments to invalidate the opinion.

The principal external phenomena of scurvy are a dark coloured blood, and purple, blue, and violaceous coloured spots on the skin, dark coloured, tumid, and spongy gums, a foetid breath, and foetid excrements; and a great tendency to gangrene. But it has been proved that oxygene reddens the blood, giving it the
carnation

carnation tint which we observe it have in the arteries of healthy people. If scurvy, therefore, consisted in a super-oxygenation of that fluid, why are not the usual effects of such a state to be discovered?

It is now a well ascertained fact, that of all remedies which have been tried for the cure of this disease, none succeed so well as acescent vegetables, and the vegetable and mineral acids; but these contain vast quantities of oxygene, which they easily part with in the human body, and which, therefore, ought to do harm, were scurvy owing to too much oxygene in the system. Did any one ever hear of scurvy being cured by alkalies, by spirits, or any medicines which do not contain oxygene? Is not animal flesh alone incapable of curing the disease, although undoubtedly it is in itself a more powerful stimulus than vegetable food, and which, in a malady arising from an abstraction of stimuli, might therefore be supposed to do good?—These arguments tend to prove that the basis of Dr.

GIRTANNER'S

GIRTANNER's reasoning is faulty. It may appear, nevertheless, to many, that oxygene is probably the principle on which the irritability of bodies depends. This seems to be Dr. BEDDOES' opinion, as well as Dr. GIRTANNER's, and he makes it a ground of argument in support of his aerial method of treating phthisis. The success of his practice will certainly not be adduced in support of the opinion, since it may be safely asserted that there is hardly any other treatment which has been extolled for the cure of this melancholy disorder which has not shewn powers equal, if not superior, to those exhibited by breathing an atmosphere of a reduced standard.

But to confine our arguments to the hypothesis itself, it is to be remarked, that all substances which are known to stimulate are supposed to act by withdrawing the oxygene from an irritable body, by means of a superior degree of chemical affinity which they have for that subtle element.

Dr. GIRTANNER

Dr. GIRTANNER reduces all bodies which come in contact with the "*irritable fibre*" under three classes.

" *The first* comprehends those which have
" the same degree of affinity to the irritable
" principle, or oxygene, as the organized
" fibre itself. These substances produce no
" effect on the fibre.

" *The second* contains those which have a
" less degree of affinity to the oxygene than
" the fibre has. These substances, coming
" in contact with the fibre, will surcharge it
" with oxygene, and produce the state of ac-
" cumulation. These substances may be called
" negative stimuli.

" *The third* class contains those substances
" which have a greater degree of affinity to the
" oxygene than the fibre itself has. These,
" coming in contact with the fibre, will de-
" prive it of its oxygene, and produce the
" state of exhaustion. I shall call these posi-
" tive stimuli."

In

In regard to this theory (as it is called) I have to observe in the first place, that the whole phenomena of mechanical and mental stimuli on the irritable parts of animals are not only left unexplained, but really stand in direct contradiction to it. Does a piece of rock crystal, a particle of sand, a thorn, or the point of a pin, all of which stimulate, draw oxygene from a muscle? Can any proof whatever be given of their having suffered any chemical change upon being applied to an irritable part? Yet they are all of them capable of exciting inflammation when applied to naked vessels, or muscles. The same questions may be asked concerning our thoughts, considered as stimuli. We choose to walk, and accordingly we get up and walk. In what manner can the oxygene in our limbs be affected by simple volition? The brain must be supposed to be a chemical laboratory, and the soul an operative chemist who prepares agents which have a more powerful attraction for oxygene, than the muscular fibre. These, it is to be imagined, are sent along the nerves quickly or slowly, in large or small doses, according as
a man

a man chooses to dance, or to walk, to lift a load, or to lift a feather.

It is a curious circumstance in regard to this theory, that oxygene is considered, not only as the principle of irritability, but also as the agent that acts on it. Dr. G. indeed, denies this, and says that oxygene, and bodies which contain it in great abundance, are only negative stimuli, that is, they yield it to the muscular parts, and predispose them to greater action. Cold, which is a negative stimulus, and hunger, if too long continued, gradually destroy life itself, in the way in which all negative stimuli are supposed to produce their effect, that is, by not supporting action. If bodies which yield oxygene are to be considered as negative stimuli, they ought, therefore, to do the same; but I appeal to facts if this is the case. Does not red precipitate, when applied to a sore, instantly excite a violent action in the part? Do not corrosive sublimate (oxygenated muriate of mercury,) and white arsenic (white oxyde of arsenic) act in the same manner? If these substances produce their effects in no other

way than by causing an accumulation of the principle of irritability, where is the stimulus which produces the inflammation? The oxygen which these bodies are supposed to yield cannot be at the same time the principle of action, and the exciting cause of action. If a negative stimulus of this kind were taken into the stomach, one would naturally imagine it would cause an accumulation of irritability in the whole of that organ, and if any stimulus were to act on the part, a general inflammation of that organ would ensue. But how is this to be reconciled to the fact? When a person dies who has been poisoned by arsenic, is not the inflamed part limited to those places with which the arsenic has been in contact? A highly inflamed, and sometimes gangrenous spot, not larger than a shilling, or a half-crown piece, is discovered. All the rest of the stomach, except it be those places immediately surrounding this spot, are in general but slightly inflamed.

The manner in which stimuli act, and produce the contraction of muscular and other
irritable

irritable parts of the body, are phenomena which must awaken the spirit of inquiry in every man who has the slightest tincture of it in his mental composition; but it is not by crude and hasty conjectures that we can arrive at a knowledge of these mysterious intricacies of nature. It is, for this reason, that the investigation of these subjects shall be delayed until a number of other phenomena have been examined. The deeply learned BACON, and BOYLE, modestly conceived that, previous to the formation of general principles, it was first absolutely necessary to examine with much caution, patience, and impartiality, every fact connected with the branch of science, to which the general conclusion related; but this slow, yet necessary process, does not well suit the temper of the present times. Systems are formed in a trice, and constituted *theories* by the authority of one or two individuals. We simplify every thing in a most wonderful manner, and endeavour to approach the sacred fountain of truth by leaps and bounds, as if we were suddenly

endowed with powers totally unknown to the philosophers of former ages. Man is a fibre which bends itself into a ring, then becomes a tube, and then an animal (*a*). The principle of his motions is oxygene (*b*): ideas are motions of fibres (*c*): vegetables have ideas (*d*): children may be begotten of any sex, shape, or feature, at the will of the male parent (*e*). The whole of living bodies are made up of a few airs; and the great globe itself is only a splinter of a fractured fun (*f*) !

(*a*) Zoonomia, Vol. 1. Sect. xxxix. (*b*) Girtanner on Irritability. (*c*) Zoonomia, Sect. iii. (*d*) Same book, Sect. xiii. (*e*) Same book, Sect. xxxix. (*f*) Buffon's Theory of the Earth.

CHAPTER II.

ON SENSATION.

Common definition of Sensation; fault found with it; necessity of other terms. Nervous impression, what it is. Sensorial impression. Mental perception. External and internal nervous impressions. Application of these terms in the explanation of various phenomena. New hypothesis of Sensation. Figure of impression, how to be conceived; its transmission from one part of the nervous system to another. Examination of opinions.

WHEN a foreign body comes in contact with the extremities of our nerves, a certain change, or affection, is immediately produced in them, of which we are, for the most part, conscious, and which is denominated *sensation*, or *feeling*.

The

The capability which a nerve possesses of being thus affected, is denominated its *sensibility*, and the change that takes place in it is supposed to be an affection of the *energy of the nerves*, or of the *sentient principle*.

Simple as these terms are, it must be evident that they do not explain any thing in regard to the effects which external bodies produce in our nerves; and, indeed, they are not sufficiently expressive of the various circumstances which appear to constitute Sensation.

The *first* effect arising from the action of an external body, which forms a part of sensation, is the change that takes place in that part of a nerve to which the external body is applied; the *second* is the change or affection of the brain, which happens in consequence of the external impression having been communicated to it; and the *third* is the change produced in our mind by this affection of the brain.

The

The two first effects are, in a great degree, corporeal, but the third is not to be explained by the principles of any facts in physics, of which we have hitherto acquired a knowledge.

It is a circumstance of remarkable singularity, that all our best metaphysicians should agree in considering sensation as a mere affection of the mind, and that men, acquainted with the œconomy of the animal, should, in their physiological writings, have so fervently copied after them. We shall soon be convinced that the affections of the brain and nerves, which arise immediately from the action of an external body, are phenomena totally distinct from those produced on the mind. It becomes necessary, therefore, to distinguish them from each other by different appellations.

To the change produced in the nerve by the application of an external body, we apply the name of *nervous impression*. To the second, or change produced in the brain, by the communication of a *nervous impression*, I give the
name

name of *sensorial impression* from the word *sensorium*. Now we shall afterwards find reason to believe, from many phenomena, that it is only under certain conditions that we become conscious of any nervous impression, even although we have proof that it has been communicated to the brain. But when an impression is conveyed from the extremities of a nerve to the mind, we then call that affection of the mind a *mental perception*. It is surely unnecessary to remark, that a mental perception is totally distinct from the consciousness we have of it. A mental perception is a mere impression as it were; a passive effect, produced on the mind by means of external objects. Our perceptions of external bodies correspond in number, kind, and force, with our feelings; but consciousness is the quality of some active principle residing in the mind, by means of which we know not only when it is acted on by external agents, but also when it exercises its own faculties, and moreover what the result of these operations are.

As

As it is of great importance to discriminate accurately between these different affections, especially between nervous impressions, and consciousness, since they have been too frequently confounded with one another under the general term sensation, I shall endeavour to give a clearer notion of them by one or two illustrations. Other examples will frequently occur afterwards.

First, it may be mentioned that nervous impressions are of two kinds, as justly remarked by the learned UNZER. They are either *external*, or *internal*.

By *external nervous impressions* are meant all such as arise from the application of any body to that extremity of a nerve which is most remote from the brain, let that nerve terminate in whatever part of our frame it may. Therefore all impressions on the extremities of the nerves of the skin, eyes, nose, ears, mouth, stomach, intestines, kidneys, bladder, &c. are to be considered as external impressions.

On

On the other hand, *internal nervous impressions* are, first, all such as take place at the origin of the nerves, as they spring from the brain, or spinal marrow, and in such cases they are, in general, nothing else than the mere communication of a *sensorial impression*; or, secondly, they may arise in any part between the origin of a nerve, and its extremity. Thus, suppose any animal, which retains life for a long time, such as a frog, or turtle, to be decapitated, and the spinal marrow irritated, so as to produce convulsions in all the muscles, such an irritation is to be considered as an internal nervous impression; water in the brain, or blood effused on its surface, producing general convulsions, are in like manner to be considered as so many bodies, creating internal nervous impressions.

In our ideas of external and internal impressions, the brain may be considered as the center of a great circle, and the remote extremities of the nerves as its circumference. Every impression which proceeds from the circumference to the center is to be considered
as

as external, and every one on the contrary, that proceeds from the center to the circumference, is internal. In this way, one and the same impression may be both external and internal as to its ultimate effects ; for instance, if it be received on a part of any nerve, which lies between the center and circumference. When a blow ~~is~~ received on a well known spot near the elbow, a person is generally conscious of it, both at the part where it was received, and also at the extremity of the little finger. The impression, as to its effects on the mind, by which a person becomes conscious of it, may be called *external*, and as to its effect on the remote extremity of the nerve in the finger, *internal*. The disease to which physicians have given the name of epilepsy, consists in the patient's being suddenly deprived of all the mental faculties, and of the consciousness which attends their operation, while the muscles of voluntary action, and many of those of involuntary motion, are thrown into the most violent convulsions, respiration, and the circulation, continuing free, or but little impeded. It is also

also a well known fact, that this disease may arise from local irritation, such as worms in the intestines, or from matters which vellicate or disturb the structure of these delicate parts.

The explanation of all these phenomena naturally enough presents itself, after what has already been said concerning the effects which follow the action of external bodies, on any set of nerves.

All impressions on the extremities of these bodies are naturally determined to the brain. It is probable that the compression on the brain, called *sensorial impression*, always corresponds in kind with the original impressions on the nerves. When these are weak, it is but slight, when violent it is greatly disturbed. But it seems natural to suppose, that when the organization of the brain is much deranged by the violence of any impression, it no longer becomes fit to act upon the mind, or to be acted on by it. The derangement of the nerves of the intestines, by the gnawing of worms, is of this violent kind, and being
communicated

communicated to the brain, totally impedes all mental operation. And hence the person becomes unconscious of the impressions of external objects, and falls down senseless. Yet the sensorial impressions arising from the irritation of the worm produce their physical effect on the origin of other nerves, and are transmitted along their course to the muscular parts of our frame. They act like any other physical stimulus, and incite them to strong action. They are repeatedly relaxed and re-excited according to the first law of irritability.

From this we learn that mere impressions on the nerves and brain are quite distinct from the affections of the mind; and when we speak of these impressions in general, we shall always mean the corporeal affection, in contradistinction to mental perception, which only takes place when the impression operates on the mind. This subject will be further elucidated in the succeeding parts of this work.

Our

Our next inquiry is a very intricate one. *What is the nature of that corporeal change produced in our nerves by the action of an external body, to which the name of nervous impression has been given?*

When any body is applied with force against another, two distinct effects are immediately produced; a certain quantity of impetus, or momentum, as it has been called, is communicated from one to the other, which tends to displace it from the situation it has, in regard to the bodies which surround it: and, *secondly*, those particles of each of the two bodies which are made to come nearest to perfect contact in the moment of concussion, are deranged as to the situation they were in previous to the moment of concussion.

This derangement, or displacement of particles, is different in different bodies, and it is also different in the same body, under different circumstances.

In

In the *first* place, it varies according to the degree of force with which the two bodies strike each other. In some instances it only occasions a temporary displacement, for as soon as the moment of concussion is past, the particles resume their former situation; thus, when two ivory balls are struck together, the particles of which each ball is composed suffer a temporary compression, and the balls become flatter; but as soon as the external force ceases, the particles regain their former situation. At other times the derangement of particles is permanent. This is of two kinds. In the one case the particles of one of the bodies are so far removed, by the external force, from the rest of the mass, as to destroy their attraction for it, and they consequently are completely separated from it. In the other instance, the particles of the body struck are so far distant from their spheres of mutual repulsion, that they remain in the position into which they are forced; as for instance, when a ball is struck against a piece of moist clay.

In

In the *second* place, the derangement of the particles is different according to the densities of the two bodies ; for it must be evident that a hard body will occasion a much greater displacement of particles in a soft one, than in one of its own density, the resisting cause being necessarily less.

In the *third* place, it is different according to the elasticity of the body. The nearer the particles of any body are to their sphere of mutual repulsion, the more elastic that body must necessarily be. In them a slight compression is sufficient to excite that power into action, and the particles, therefore, have an immediate tendency to regain their former position ; but as repulsion, or the cause of elasticity, exerts its influence equally in all directions, it is evident that the particles which are next those which have received the blow, must also suffer a similar displacement, and their displacement will affect those which lie next to them, and thus the impression of the external body is transmitted by them to a very great extent. It is on this principle that sound is quickly conveyed

conveyed to a great distance, as well as through solid elastic bodies. Doubtless, there is a point where this effect must cease, even in the most elastic ones, for as no compression can take place without a kind of friction between the particles, the compressing power must necessarily be gradually weakened in its action.

In the *fourth* place, this derangement of the particles of a body struck, is different according to the arrangement of the surface of the body which strikes it. This is most evident in such as are not very elastic. When we press our finger on a piece of soft clay, we observe the marks of the furrows of the skin upon it: and on the same principle melted sulphur, glass, or wax, receive and retain the impression of many bodies with variegated surfaces. The same thing must necessarily happen to elastic bodies; but then as the particles resume their original position almost as soon as the external force is withdrawn, we cannot see it. I call this general effect which impinging bodies produce, the *figure of impression*, or simply, *impression*.

The facility with which the figure of impression of any body is transmitted from the part where it is first received, to the rest of its mass, seems to be in a direct ratio with the repulsive power of the particles of that body. On this account one would naturally imagine it to be greater in the rarer fluids, than in the elastic solids. In corroboration of which conjecture, it may be mentioned that the various gases, or airs, possess this quality in a much higher degree than solids.

That the particles of which bodies are composed are not in a state of perfect contact, is a truth established in physics ; for, independently of the repellent power with which they are endowed, and which prevents their complete union, a certain portion of heat is constantly present, which also keeps them separate from each other. A convincing proof of this position is, that the most solid body we know may be made to contract in all dimensions by withdrawing heat from it, and may be made to re-expand by giving it its former

former temperature. The heat either combines itself with the particles of the body, increasing their natural repellent power, or it insinuates itself between them, forming atmospheres for each particle; and owing to the great repulsive power which the particles of heat have for each other, they keep those of the body asunder. When it is asserted, then, that the medullary particles which compose our nerves, are by no means in a state of perfect contact, it is only asserting that they are possessed of a certain quality which is common to all bodies. The vascularity of the cineritious part of the brain, and of the nerves themselves, their softness, pulpiness, and natural humid appearance, give reason to believe that between the medullary particles of which they are principally composed, a fine fluid is constantly secreted, which may be fitted to receive and transmit, even more readily than other fluids do, all impressions which are made on it. I do not conceive that there is any necessity for supposing it to be of a supernatural degree of fineness, such as the conjectural æther of authors; nor is it necessary to consider

consider the nerves as tubes in which it circulates. It is a constituent part of their texture, lying between and surrounding the medullary particles. The particles of this fluid, as well as the medullary part of the nerves, must, in common with all matter, have each of them their atmospheres of heat, which probably increases their natural repellent powers. When any of the particles, then, of this fluid are forcibly deranged from their natural situation, those which have been compressed act on those nearest them, and thus the figure of impression is transmitted to the brain or to other parts of the nervous system. Hence it follows as a necessary deduction, that what we consider to be the properties of external bodies, are more properly speaking, only alterations of our own nerves. These are caused, indeed, by certain physical properties in the bodies; but our knowledge of these properties is combined with the affection of our nerves. It is on this, that is founded, in a great degree, the diversity of tastes, or judgments, which different people entertain about the same external object. But this view of the subject will

will be more enlarged on in another part of the work.

As the fluid, which conveys the impressions of external bodies to the brain, appears to be secreted from the fine vessels which supply the nerves with nourishment, so it necessarily follows that they must be variously affected by every thing which alters the action of these vessels ; and hence we find two laws of sensibility very similar to those of irritability.

1. *All stimuli which excite an increase of vascular action, increase the sensibility of the nerves, but by doing so, the principle of sensation, as well as the principle of irritability, are gradually exhausted.* A certain quantity of food, wine, heat, and exercise, all render a person more lively, and more awake to the impressions which are made on his senses ; for, by means of these stimuli, the action of the whole arterial system is increased, and, consequently, all secretions go on more rapidly than they did before. The nervous fluid is diffused more copiously



copiously between the particles of the medullary substance of the nerves, and from this distention a kind of pleasurable sensation arises, which is felt all over the frame. It is then that we are most disposed for every fine and are most hurt by every painful feeling. Then, the desires which depend on corporeal sensation are apt to be awakened by the slightest causes, as we are strongly predisposed for every thing which can gratify the senses: but if the same stimuli be too great, the irritability of the body is exhausted; secretion is diminished, the nervous fluid is scantily formed, and we become dull, stupid, and languid. Our eyes do not feel the light, nor our ears the rays of sound; the brain does not receive the impressions of volition, or any of the mental operations, and we fall into a state of torpor, called sleep.

2. *When nervous stimuli are diminished, and arterial action supported at the same time, the nervous fluid is necessarily accumulated, and sensibility thereby increased.*

Hence

Hence it happens that all our sensations are increased after we have been some time without having had them excited. A person who has been long shut up in the dark, cannot, for some time afterwards, easily bear a moderate light. A person in health who is prevented from having much intercourse with society, has a high relish for the few gratifications which he can obtain. The taste of wine, and of food, is most enjoyed by him who uses them sparingly. From this it may be easily understood why healthy feelings, and healthy desires, can only be preserved by those who are moderate in their enjoyments.

Although the various opinions which have hitherto been offered concerning the cause of sensation appear to be extremely different from each other, yet they may all of them, with much propriety, be reduced under the three following classes.—*First*, those which account for it by certain vibrations of the nerves themselves; *secondly*, those which suppose the existence and motion of a particular fluid,

fluid. And *thirdly*, the actual motion of the nervous filaments themselves.

In regard to the first of these doctrines, it is to be remarked, that we have no other notion of vibration than that which is yielded to us by the vibration of elastic bodies, such as the chords of musical instruments, or the tremor of a bell, &c. If the hypothesis, then, be examined as to the spirit of its analogy, the refutation of it becomes easy; for in order that any body may vibrate, several conditions are necessary, none of which are peculiar to our nerves. It must be elastic, tense, and free from all contact with other bodies, except at the points of its support, beyond which points vibration does not proceed; but the nerves are neither elastic, nor tense, nor free from contact with other bodies in any part of their course, and consequently they cannot have any motion analogous to the vibration of a sounding body. If it be said by any author that the vibration of a nerve is a distinct thing from the vibration of a sounding chord, or, in other words, is a vibration, *sui generis*, it is impossible

impossible to refute such an assertion, because in fact nothing is explained by it. It refers to an occult cause, which the author himself does not comprehend, and therefore cannot elucidate by language.

With regard to the second set of opinions, namely, the existence and motion of a particular fluid, physiologists have been much divided, not only concerning the nature, but also concerning its peculiar mode of operating. Some regard it as the electrical fluid, others as a magnetic fluid, and others have chosen to give it the name of æther.

It would be an useless and tiresome task were I to adduce all the arguments with which the authors of these opinions endeavour to support them, together with the objections which may be opposed to them ; he who wishes to read almost every thing valuable on the subject must consult the 10th Book, and 8th Sect. of HALLER's physiology of the human body. It may be briefly remarked, however, that the phenomena of sensation do not correspond with

with the well-known phenomena of electricity, or magnetism. Electricity, indeed, produces sensation, and when transmitted in a certain quantity, it operates as a powerful stimulus upon the irritable parts of our frame, exciting immediate action in them; but this is an effect which it has in common with various other stimuli. Electricity is a matter which like heat is contained in a certain proportion in every body, and consequently the nerves must have their portion; but this is no proof that it is the medium through which we receive the impressions of external objects. If it were the medium of our sensations, there would be no need of any such bodies as nerves, for as it pervades the whole human frame, impressions made upon it could be conveyed to every part of the system, without any such contrivance.

Of all vague conjectures concerning the nature of the nervous fluid, that one which supposes it to be the magnetic fluid appears the most absurd, since there is not even a shadow of similitude between the phenomena
of

of magnetism, and those of sensation. The doctrine of æther is as little deserving of any serious thought; for the existence of such a fluid has never been proved, and even if it were demonstrated, it is hardly possible to conceive that it should be endowed with all the fanciful virtues which those who believe in it suppose it to be possessed of. It is one of those imaginary occult qualities, by which the ancients attempted to explain many phenomena they did not understand, such as the motion of the heavenly bodies, the refulgency of the sun and stars, the life of animals, and the growth of plants, &c.

In order to understand Dr. DARWIN's opinion concerning the use of the nerves, it is necessary to be acquainted, in the first place, with the definitions which he gives of the "*immediate organs of external sense*," and of idea. "The immediate organs of external sense," says the Doctor, (*Zoonomia*, vol. I. p. 11.) "consist of moving fibres, enveloped in the medullary substance above mentioned; and are erroneously supposed to be
" simply

“ simply an expansion of the nervous medul-
“ la, as the retina of the eye, and the rete
“ mucosum of the skin, which are the imme-
“ diate organs of vision, and of touch. Hence
“ when we speak of the contractions of the
“ fibrous parts of the body, we shall mean
“ both the contractions of the muscles, and
“ those of the immediate organs of sense.”

His notion of idea is as follows: “ The
“ word idea has various meanings with the
“ writers of metaphysic: it is here used simply
“ for those notions of external things which
“ our organs of sense bring us acquainted
“ with originally; and is defined a contraction
“ or motion, or configuration of the fibres,
“ which constitute the immediate organ of
“ sense.”

The arguments on which Dr. DARWIN at-
tempts to found his hypothesis concerning the
contractility of the nerves, are a number of
conclusions drawn from the phenomena of
ocular spectra. “ Place,” says the Dr. vol. I.

p. 16,

p. 16, “ a circular piece of red silk about an
“ inch in diameter, on a sheet of white paper,
“ in a strong light ; look, for a minute, on
“ this area, or till the eye becomes somewhat
“ fatigued, and then gently closing your eyes,
“ and shading them with your hand, a circular
“ green area, of the same apparent diameter,
“ becomes visible in the closed eye. This
“ green area is the colour reverse to the red
“ area, which had been previously inspected.
“ Hence it appears, that a part of the retina,
“ which had been fatigued by contraction,
“ relieves itself by exerting the antagonist
“ fibres, and producing a contraction in an
“ opposite direction, as is common in the
“ exertion of our muscles. Thus, when we
“ are tired with long action of our arms in
“ one direction, as in holding a bridle on a
“ journey, we occasionally throw them into
“ an opposite position, to relieve the fatigued
“ muscles.”

The delusive conclusion which is here presented to the mind, seems to arise in a great degree from employing the word reverse, in
the

the same sense as the word opposite. The relaxation of a muscle may, with great propriety be said to be a state which is *opposite* to that of its contraction ; but supposing, for a moment, for the sake of argument, that sensation is nothing else than the contraction of fibres, similar to the contraction of a muscle, we then cannot say with the same propriety, that any one colour, although reverse to another, indicates an opposite state to contraction ; for, as all sensation is supposed to be a kind of muscular contraction, and every colour a sensation, the green spectrum which is seen after looking at a red object, indicates contraction as much as the red one does. The author of the *Zoonomia* seems to have been aware of this deduction ; for, in the passage cited above, which is very similar to one in a paper published in the *Philosophical Transactions*, on the subject of ocular spectra, by the late Dr. R. W. DARWIN, of Shrewsbury, the green vision is not compared to relaxation, but to the contraction of antagonist muscles.

This explanation, and illustration of the man holding the bridle, shews that Dr.

DARWIN

DARWIN considers the optic nerve like an arm, having flexors and extensors, and fingers to grasp with, by means of which it may assume various gesticulations. But I leave it to the good sense of every man who has seen a nerve to say, whether its disposition and internal fabric, affords the slightest proof in favour of such a fanciful notion as this. If every nerve has antagonist fibres, there must be some part of a nerve fitted for their insertion. Is the evidence which we have of their soft and pulpy texture capable of being reconciled with such an opinion? If the nerves are to be compared to muscles, the comparison must be adhered to strictly; and each single nerve considered as a single muscle. The optic nerve of any one eye being a single nerve, is to be regarded according to the spirit of the comparison, as a single muscle. Now a single muscle is capable only of various degrees of contraction and relaxation; that is, it exhibits only two phenomena, which are opposite to each other; for the mere degrees of contraction, or relaxation, are not varieties in kind. But the optic nerve is capable of
receiving

receiving innumerable sensations, all distinct from each other.

Dr. DARWIN says "that if the change or
" motion of the retina was a mechanical im-
" pression, or a chemical tinge of coloured
" light, the perception would every minute
" become stronger and stronger; whereas, in
" the experiment with the piece of scarlet
" silk, it becomes weaker and weaker." That
all impressions must necessarily become weaker
the longer they are continued, follows from
the nature of the sentient principle; for if it
depends on the action of vessels, or, in fact,
any living action whatever, it must be ex-
hausted by stimuli long applied. But let us
see to what thoughts this fact leads us, having
Dr. DARWIN'S hypothesis in view. It is an
invariable law of all contractile parts, that
when a stimulus has been so long applied as
to exhaust that principle on which its con-
tractility depends, it falls into a state of
relaxation. Now granting that the retina is a
contractile part, it follows, that when it has
been completely excited by any stimulus, the
rays

rays of light for instance, which come from a piece of scarlet silk, then the retina must fall into relaxation, or an opposite state. Now if the green spectrum be an idea in the mind, excited by the relaxation of the optic nerve, this same coloured spectrum ought always to be seen as often as the retina has been previously fatigued. But this we know is not the case. Ocular spectra are of various colours; many people cannot be made to see them; and in different people the same object shall excite different coloured ones. I certainly do not pretend to account for these phenomena. I do not think we have yet a sufficient number of facts on which a good hypothesis may be built. But it must be evident to every impartial man, that so far from their proving any analogy between sensation and muscular contraction, they stand in direct opposition to it.

CONTINUATION
OF THE SAME SUBJECT.

Application of the hypothesis of sensation to the principal phenomena of the external senses.

THE particular contrivances by which the Great Author of nature has fitted us for acquiring that degree of knowledge of external bodies, which it has been deemed proper we should obtain in our present state of existence, are denominated the external senses.

It is not my intention to enter into a minute detail and examination of the wonderful phenomena which these curious organs offer to a reflecting mind, far less to attempt a description of their wonderful structure, for this would lead me much beyond the limits within which I have proposed to confine my researches. To point out the striking analogy which exists between the whole of the senses, in regard to the manner of their being affected by external bodies, and also in regard to their effects on the mind, are the objects of this chapter.

Our

Our external senses are five in number : the sense of touch, the sense of seeing, the sense of hearing, the sense of smelling, and the sense of tasting. In their relationship with external bodies, they may be said to differ from each other in two particulars ; *first*, in as much as each of them is fitted to receive the impressions of certain bodies which produce no sensation in the others ; *secondly*, in as much as the same body does not produce a similar sensation on any two of them. The sound of a cannon which causes a sensation in our ears that can hardly be supported, has no influence on the nerves of our nose, although much more exposed than those of the organ of hearing ; a vivid light which produces pain in our eyes, has no effect on our organs of taste ; the rays of the sun produce a very different effect on the organ of touch, from what they do on the organ of vision, &c. Upon what principle this difference in the nerves of our external senses depends, is by no means easy to explain. It may probably be owing to a variety of causes existing in the œconomy of the nerves themselves ; for, although they all ori-

ginate in the brain, it does not follow that they should all of them have exactly the same internal structure. Those of the external senses may be as different from each other as the various other organs of the human frame. We find that the arrangement and action of the smaller arteries of the system are different in different parts, and it is therefore not in opposition to analogy to imagine, that although all the arteries of nerves agree in respect to their secreting a particular fluid, yet that fluid may be differently modified in those of the eye from what it is in the nerves of the nose, the mouth, or the ear, &c.

The seat of the sense of touch is in the nerves of the rete mucosum, and skin of our body, but it is much more acute in some parts than in others, such as our fingers; and in order that this exquisite sense with which these parts are endowed may be employed to our advantage, they are formed in such a manner as to examine an extensive surface. To the different impressions which external bodies make on the nerves of our skin, we apply
different

different names, or signs, which, with a little modification we also apply to the supposed qualities of the bodies that excite the impressions ; thus, external bodies, which act upon our sense of touch, are said to be hard or soft, wet or dry, rough or smooth, hot or cold ; and the particular qualities in the bodies themselves, which we imagine produce the different impressions, we call solidity, moisture, roughness, smoothness, heat, cold, &c. These, together with a very limited knowledge of the shape and weight of bodies, constitute the whole of the knowledge of the external world, which we acquire by means of this sense.

With regard to those of *taste* and *smell*, there are but few phenomena which require any particular explanation.

By the former we become conscious of the impressions of all bodies which are soluble in the saliva ; by the second, of all such as are fitted to act on the extremities of the olfactory nerves. The bodies which act on these are
of

of almost infinite variety, and hence we have hardly any generic names for impressions on this sense.

In most of the other senses the case is widely different ; for although there are many bodies which differ from each other in regard to certain qualities, yet as they produce similar sensations, they are often on that account classed together ; thus, in regard to touch, we have hard bodies, soft bodies, moist bodies, dry bodies, rough and smooth ones, and hot and cold ones. In regard to taste, we say they are sweet and sour, bitter or salt, &c. and in describing such bodies, therefore, to other people who may not have felt or tasted them, these expressions are of great use. But it is very different in regard to the minute bodies which act on the nerves of our nose : for they are so diversified in respect of structure, that very few of them yield similar impressions ; and we find ourselves obliged, therefore, to distinguish each one by the name of the body which yielded it : thus, we have no other way of expressing the smell of a rose, of lavender,
of

of jafmine, or of a violet, &c. but by faying it is the fmell of a rofe, of lavender, of jafmine, or of a violet, &c.; which mode of expreffion explains to us, indeed, the particular perceptions, corresponding to the external impreffions, but to another who never experienced fuch impreffions, they convey no diftinct idea whatever.

The fenfes of hearing and feeing have fo many peculiarities, that a little more time muft be employed in their inveftigation than what has been allotted to the others, in order to give a tolerably juft account of the phenomena which they exhibit.

ON HEARING.

WHEN we gently touch any body whilst it emits a found, we feel that it is in a ftate of tremor, or vibration; but as there is no immediate contact between the body itfelf, and our ear, we cannot conclude that that affection of the organ which we call hearing, arifes folety from the tremor of this founding body.

Other

Other observations and facts give us more accurate ideas. We have discovered by experiment, that all bodies capable of emitting sound, when placed in a vacuum, do not affect our ear, although they vibrate; and again, as all concussions of air, such as those occasioned by the bursting of a bomb, or of a bladder, the cracking of a whip, or the act of coughing, all produce sound, we are led to conclude that the tremor of the sounding body must have been communicated to the air, and that it is this affection of the air which operates on our ears. A sound, therefore, is a compound effect, even before it reaches our organ of hearing.

We proceed to observe, that between the expanded extremities of the auditory nerve, and the external air, several bodies intervene, all of which must be more or less affected before we hear. These are the external membrane, called the tympanum, a certain arrangement of small bones, immediately behind that substance, a certain quantity of air, and a liquid,

liquid, the properties of which have not been well investigated.

It was natural to suppose that if air transmitted sound as an elastic body, every other elastic one would do so likewise; and accordingly we find this to be true; all elastic fluids, such as the different kinds of air, and even water itself, communicate sound. Upon this principle we can also be made to hear sounds through other mediums than those which affect the external ear; for instance, if a communication by any elastic substance be made between the bones of our head, and the sounding body, the peculiar tremor of that body will be communicated to the auditory nerves. The story of a person who was deaf, and who enjoyed the music of a harpsichord, by applying one end of a cane to the instrument, whilst he held the other between his teeth, is well known.

It is not a just conclusion, that the affection of the air, occasioned by a sounding body, is analogous to its propulsion, if I may use the expression,

expression, or to its common progressive motion. A sounding body, like every other elastic one, has two distinct motions when struck, each of which produces a different effect. First, its common vibratory motion, by which the body of air in contact with it is propelled; secondly, that particular derangement of its particles which I have called the figure of impression; and it is this which when communicated to our ear, produces the sensation of sound.

To prove both of these positions, namely, the great difference that exists between them, and that the latter only is the cause of sound, we have only to attend to the different phenomena which they exhibit. The common motion of air, as communicated by a vibrating elastic body, can be felt by the nerves of the skin, and when violent, it disturbs every light substance around it, causing even a rupture of the tympanum of the ear itself, which effect indeed, is commonly, but falsely ascribed to the sound.

But

But as the progress of sound, or of the figure of impression, consists only in a mere derangement of the situation of the component, or invisible particles of a body, in regard to their distance from each other, and not in the motion of the body, as a volume, or mass, it gives no impulse sufficient to put any other one in motion, and consequently we find the very lightest of all, such as smoke, flame, or vapour of any kind, are not at all deranged by it, although these transmit sound equally well as other elastic fluids.

Again, the common propulsion of a volume of air as struck by a vibrating body, is retarded by an opposite current of air; but sound is conveyed against the wind.

The strength or weakness of any sound depends on the strength or weakness with which the figure of impression is communicated to the ear. It depends, therefore, originally, on the force of the oscillatory motion of the sounding body.

When

When we hear and compare several sounds, we have the idea of what is called a note, or tone in music.

The tone produced by a thick and long chord, which is not greatly stretched, we call a deeper tone than one produced by a thinner, shorter, and more highly distended one. Now, as the only difference between the effects of these two chords consists in this, that the thicker, longer, or less distended chord, vibrates less frequently in any given time, than one which is thinner, shorter, and more highly distended, we say, that the difference between a high and a low note consists in this, that in the former, (the high note) the impressions communicated to the air succeed each other more rapidly in a given time than in the latter.

If we take two chords of equal thickness, and equally distended, but one of which is only half as long as the other, the sound of the one seems to our ear a mere repetition of the sound of the other, with this only difference, that the one which is shortest gives a
sound

sound that appears higher than the other. In music, such sounds, namely, those which appear mere repetitions of each other, and differ only in the highness or lowness, are called octaves, the higher octave having double the number of vibrations in a given time than the lower.

Between any two octaves the ear is sensible of a number of other notes, or tones, seven of which are called radical, in the theory of music, and the other five half-tones.

These differ from each other only in the difference there is in the number of impressions communicated in the same space of time; for instance, when two sounding chords strike the air, in the proportion of two to three, we call these fifths to each other; when as four to five, they are called thirds, majors, &c.

It is impossible to proceed further in the explanation of these phenomena, without entering much more into the theory of music than

than what is immediately connected with our subject.

As all elastic bodies composed of different materials must be differently arranged, as to their integrant parts, it follows that the figure of impression of each must also be various ; and on this principle we are enabled to explain a difficulty, a solution of which, I believe, has never yet been given. How comes it that our ear is able to distinguish, not only the pitch of any note, and its strength and weakness, but also to discern, as it were, a difference in the sounding bodies themselves, from which the tone issues ? How comes it, for instance, that we know that the note A, when sounded by a flute, hautboy, violin, or harpsichord, comes from those different instruments even although they are not seen.

The strength of a note, we have already said, depends merely on the strength of the vibration in the sounding body ; and the height or pitch of any note on the number of vibrations which it gives in a certain time ;
but

but this other affection of the air, by which we distinguish a difference in the sounding body itself, is quite distinct from these, and depends solely on the difference in the figure of impression given by each vibration of the body to the air, and from that communicated to our ear. The column of air which is emitted by a flute, has a different arrangement of parts from that of a hautboy; the chord of a violin has a different arrangement of parts from that of a harpsichord; and the sounding board of the one is also of a different structure from that of the other, therefore the figure of impression in all these must also be different.

We next proceed to explain some of the phenomena of

S I G H T.

The greater number of the more remarkable phenomena of vision are to be explained by the figure and external structure of the eye, and refractory powers of the humours, and by the physical properties of light and colours. These, although very interesting in themselves, must

must be passed over in silence, as they would require much time and place to be fully discussed. Besides, they are not the phenomena concerning which there is so much obscurity and difference of opinion, as a few others which are immediately to be taken notice of, and which more particularly relate to the doctrine of sensation that has been advanced.

By means of light, and the organ of sight, we become acquainted with the situation, size, shape, motion, and colour of external bodies.

The rays of light as reflected from external objects, cross each other in their passage through the eye, and form an inverted image on the retina. In this respect, the eye resembles an apartment, the shutters of which are completely closed, and into which no light is admitted except by means of one small opening. But it would be carrying our comparison too far to suppose the soul, or mind, to be a spectator, which looked at this image: and much difficulty has arisen from this comparison having been already made; for in this
case

case it is almost impossible to explain why objects are seen in their natural position, since their image is inverted on our retina.

The rays of light which are reflected from the objects around us are to be considered as equally capable of producing an impression upon the retina, as a stone is of yielding one to the nerves of the skin. These impressions are external nervous feelings. It has been a great misfortune in science, that this sense has been too much considered as of a superior and distinct kind to the rest. Mysteries have been sought for in it, which it has been imagined do not take place in the others; and whole volumes have been written to explain them. Two phenomena in particular have attracted the notice of philosophers. The *first* is, that objects are seen single with two eyes; the *second*, that objects are seen erect, and in their natural positions, although it can be proved beyond a possibility of doubt, that their image is inverted on our retina.

These phenomena do not appear to have any thing more mysterious in them than what is to be discerned in those of every other sense.

How the principle upon which the first hinges, should have been supposed by so many philosophical writers to be peculiar to the sense of sight, is not easily to be explained; and how it should have been attempted to be accounted for, on physical principles, except by men unacquainted with the analogies which exist between impressions on the optic nerves, and those of other nerves, I know not.

The question is simply this; how the impression of any body, happening on two distinct nerves, should only yield one perception to the mind? It must be evident to every one that this difficulty is not peculiar to vision; men have two ears, yet hear but one sound. But if this phenomenon appears wonderful in regard to these organs, how much more ought it to have struck philosophers in regard to the other senses, especially that of touch, if the
true

true analogy between the senses had been attended to; for here not only two, but several distinct nerves may be impressed by one body, and yet only one perception is yielded. If, for instance, a person takes a large stone, or ball, in both his hands, there are many distinct nerves which receive the figure of impression, and yet the person has only the perception of one body. The analogy may be carried farther. When either of the two eyes is pressed a little out of its common situation, so that the image of an object shall fall on a different part of the optic nerve of that displaced eye, from that which corresponds with it in feeling in the other eye, we have the perception of two objects. The same thing holds good in regard to touch. If the impression of any body be made to fall upon two branches of nerves, not accustomed to receive such impressions at the same time, we think we feel two bodies. The common experiment of twisting the middle finger over the forefinger, and then rolling a hard pea, or small bullet between them, is a sufficient proof. But the fact is, we seem wil-

the feeling of the optic nerve, and that of those of the skin. If the organs of hearing could be displaced like the eyes and fingers, so that the radii of sound should fall upon different parts of the expanded auditory nerve from those which are accustomed to receive synchronous impressions, every single sound would for some time appear as two; at least, the analogy of the other senses justify this conjecture. With regard to the works written with a view of illustrating the curious phenomenon in question, it may be observed that the greater part of them, so far from explaining its singularity, only remove it a step. Those who pretend to account for it on mathematical principles, endeavour to discover what that particular direction is in which an external object must be placed, in regard to the two eyes, in order to be seen single. But supposing this to be ascertained, as I believe it has lately been by my friend, Dr. WELLS, still the mysterious part of the phenomenon remains to be accounted for: I mean, how the impression, or image that falls on each eye, should only give a single perception to the mind.

Two

Two other phenomena of vision have much engaged the attention of philosophers, the *first* concerns the distance of objects, and the *second* their situation. Those who are willing to account for every thing which concerns this sense, upon geometrical principles, assert that the angle made by the optic axis with the object, is the circumstance upon which the true explanation hinges. According as the angle is more or less obtuse, so does the object appear to be nearer or farther from us ; for when a body is placed near to the eyes it necessarily makes a larger angle than when it is at a greater distance.

In regard to this doctrine, it may be observed, that as it puts experience entirely out of the question, so it would be fair to conclude, if the opinion were true, that all men who see equally well at equal distances, ought to be equal good judges of distance itself ; but this we know to be contrary to fact.

Men whose profession obliges them to exercise their eye, with a view of acquiring just notions

notions concerning distance, find, in the first place, that the talent is constantly improved by habit ; and, in the next place, that they soon acquire a superiority in this respect over other men, whose organs of sight are equally good as their own. But if we saw by angles and lines, or any other geometrical figures, these facts would be inexplicable. There are no two men who judge with equal accuracy concerning distance.

That an external object makes a greater or lesser image on the retina according as it is more or less near to the eye, is a fact which can be geometrically proved. In childhood we learn by experience, that as we approach any object it always appears larger to us, and on the other hand, the farther we retire from it the less it seems ; and as we are constantly employed in such kinds of experiments, we soon form a judgment of the distance of surrounding bodies by the size of the impression (image) which they make on the eye. Independently of our moving to and from the objects around us, by which means we acquire a
notion

notion of their relative distance, there is another common way by which we rectify our judgments in this respect, and which at the same time teaches us to judge of the relative magnitude of objects; I allude to the sense of touch. Our locomotive faculty, and the sense of touch, afford us that kind of experience upon which, in infancy, we found our judgments concerning distance; and these judgments being accompanied by particular sensations in our eye, they naturally become associated in our mind; and hence, when one and the same body makes a more extensive image at any one time, than it does at another, we conclude it to have been nearer to us at the one time than it was at the other. The strength of that principle by which our ideas are associated together in the mind, is in no instance more clearly proved than in the present. If a person from his infancy had never seen objects but through a reversed telescope, still he would be as good a judge of the relative distance of objects as any other man, provided he could transport himself from object to object, and make use of his hands. But
if

if any other man looks through a reversed telescope, the diminutiveness of the objects awakens in his mind the idea of a great distance. He sees the objects as small as if they were far from him, and he is inclined to believe them to be far from him.

The other question concerning our being supposed to see objects in a contrary position to that in which they are represented on our retina, can only be answered by the application of the same principles. We are taught in our infancy to apply the words low and lowermost to those bodies, and parts of bodies which are nearest the earth; and to those bodies, and parts of bodies which are more remote from the surface of the earth, we apply the name of uppermost, and thus we are taught to call the head the uppermost part, and the feet the lowermost part of our body. These terms, and others, having a similar signification, we are taught to apply in our infancy to all bodies which have an analogous situation to the earth with ourselves. Although objects, therefore, are inverted on our
retina,

retina, still as they have the same relative situation in regard to the surface of the image of the earth, as they have in reality, we consequently associate the notions of uppermost to those things, and parts of things, which are most remote from the earth. If an erect object is reversed, we necessarily think it turned upside down, although its head be now uppermost on our retina; for as we have never been accustomed to associate the perceptions we derive from the impressions made on the upper part of our retina, with our ideas of what is uppermost in the external world, so a figure which is reversed must naturally appear reversed to us.

It has long been a question among philosophers and physiologists, whether two different sensations, arising in one and the same organ of external sense, can be felt at one and the same time: for instance; whether upon taking a hot, heavy, solid, and smooth ball, into one's hand, the person feels at one and the same moment, that the ball is hot, heavy, solid, and smooth; or, if these sensations are
only

only felt one after the other. The difficulty involved in this question would never have occurred had clear notions been entertained concerning the office of the nerves, which constitutes physical sensation. Most philosophers have been of opinion that the sensations succeed each other, for they cannot explain upon the principles of vibration or undulation, how these sensations, as they call them, are felt at the same time.

The question itself is a very vague one, and cannot be determined if our researches and reasoning are confined to the two positions included in it, or if it be imagined that the question is to be resolved by proving one of them to be true in all cases of mixed sensation.

Without confining our view of the question, therefore, to either of the two opposite positions, I would remark

1st. That the nerves of external sense are capable of transmitting mixed as well as single impressions.

2dly. That

2dly. That the mind is capable of apprehending these mixed impressions in their mixed state; but at the same time, by the proper employment of the faculty of attention, they may be analyzed so that the mind shall apprehend each of the single impressions of which the mixed ones are composed.

These positions are proved to be true by a great number of observations. When a person enters a green-house, where the air is richly impregnated with the sweet scents of many odoriferous plants, he is immediately made sensible of a perfume which is quite distinct from that of any of the flowers which compose it. The art of cookery exhibits similar phenomena. Certain mixtures of sapid bodies produce a complicated impression on the nerves of the mouth and tongue, and one which is very different from that which any of the bodies which enter into the composition would have done singly. In such cases, the impression made on the nerves is evidently of a mixed kind.

That

That we can analyze various mixed impressions, and not only discover the individual ones of which it is composed, but can at pleasure attend to any one of them, to the exclusion of the rest, is a fact which is also proved by daily observation. A musician can either attend to the whole body of sound emitted from various instruments in a concert, or he can at pleasure attend solely to the first violin, or flute, violencello, or organ, or any other instrument. A musical chord makes a very different impression on the ear from any one of the notes of which it is composed; yet an ear accustomed to music hears distinctly the third, fifth, and octave, or any other note or notes of which it is composed. When a person suddenly grasps an unknown substance, he being at the same time blindfolded, or blind, he is conscious that the first impression it makes is a confused and unusual one, which generally alarms him so much that he cannot attend to any of the qualities it has in common with other bodies: if he continues to hold it in his hand, he then begins to examine it by directing

directing his attention successively to the various impressions it makes.

Upon the whole, therefore, I think it may be concluded, in regard to the last question, that when a body capable of affecting the same nerve, or set of nerves, in a variety of ways, is applied to such a nerve, or nerves, the various impressions which it is capable of yielding, take place at one and the same time; and the mind either may apprehend them in their mixed and confused state, or under certain circumstances may attend to the individual impressions of which the mixed one is composed.

CHAP.

CHAPTER III.

ON THE SENSE CALLED CAENESTHESIS, OR
SELF FEELING.

THE five senses which have been described are properly called external, not only on account of their situation, but also of their office. They are the means by which we are connected with the things around us; they direct us in our operations as agents, and warn us of the agency of others; many of our pleasures and pains arise from the impressions which are made on them; and all our knowledge of the external world, and of the bodies which compose and inhabit it, can only be gained through their means.

It has been said, that although the nerves of the various external senses appear to the
eye

eye of the anatomist, even when assisted by the finest glasses, exactly similar to each other in structure; yet there can be no doubt that there is some difference, either in their more minute organization, or in the nature of that principle on which their property of feeling depends, for many bodies which greatly affect some of them, produce no affection in the others; thus the rays of light which affect the retina are not felt by the nerves of the ear, nose, or tongue; odorous bodies which affect the nerves of the nose, produce no change in those of the mouth, skin, or ear; and the impression of bodies, which the air receives from sounding bodies, do not affect the nerves of the eyes, nose, mouth, or skin.

As the distinction we make between these five, depends entirely on the principle, that the nerves of each organ of sense are so constructed as to receive peculiar and distinct impressions from those of the rest; and as all the nerves of each different viscus, or organ of the body, are subjected to the influence of
the

the same principle, it would at first sight appear justifiable to make as many senses as there are various viscera; thus, as it may be proved that the nerves of the stomach feel differently from those of the liver, and those of the liver differently from those of the intestines, and those of the intestines differently from those of the kidneys, those of the kidneys different from those of the bladder, lungs, heart, trachea, œsophagus, &c. each of these parts might be said to be the seat of a distinct sense.

But as all the sensations we derive through the nerves of these parts are obscure, and do not give us any clear information of the qualities of the bodies which are applied to them, as they only yield us the general feelings of health, internal ease, and comfort, or their opposites, bodily uneasiness, pain, and disease; on these accounts they may all of them, together with the nerves of muscles, of vessels, and bones, &c. be considered as constituting sensations of one and the same kind.

It

It is in this light that a few German physiologists consider them; and, doubtless, the principle is just, in as much as it is consistent with sound analogy. They consider these feelings as belonging to a distinct sense, which they denominate *selbst-gefühl*, and *Gemeingefühl*, and which I have chosen to translate literally, and call in English, *self-feeling*. A very ingenious inaugural dissertation has lately been published at Halle, in Saxony, on this subject. To it I beg leave to refer such of my readers as desire a more ample account of the properties ascribed to the sense than what are here enumerated. See *Commentatio de Caenesthesi Dissert. Inaug. Medica Auctore, Christ. Fred. Hubner, 1794.*

The seat of this sense is in the extremities of all the nerves of the body, except those which supply the organs of the five external senses.

The permanency and uniformity of the impressions we receive by it, when in health, render us less conscious of being possessed of it; for in those who are free from disease

there is no preternatural action of any set of vessels, no unusual distention, or relaxation of any part, and consequently no new cause of sensation, agitating the frame, sufficient to withdraw attention from surrounding objects. That we derive a feeling from such a state, however, and one of a very agreeable kind to us, is evident from the many common and trite expressions of people in health, who sometimes tell us they *feel* as light as a feather; they *feel* as if they had a spring in every limb, &c. This feeling is of the agreeable kind; and to one who is just recovered from a painful disease, is a state of real enjoyment. The Germans call it the feeling of well-being, or health, *Gefühl des wohlseyns*.

On the other hand, the sensations of lassitude, fatigue, and weakness, the pains in the limbs which occur in most fevers, all uneasy sensations in the stomach and intestines; those of anorexia and nausea, and the painful uneasiness which takes place when the bladder is greatly distended, are all referred to this sense.

There

There is another kind of feeling, ascribed to it by HUBNER, which he describes with more accuracy and feeling than elegance of expression. "Huc," says HUBNER, "et re-
 "ferrem stimulum ad venerem, hanc acutam
 "caenesthesis febrem, qua homo suæ per-
 "durationis causa torquetur. Genitalium
 "irritabilitas mirum in modum evihitur,
 "omnes fibræ alacrius tremunt, humorum
 "ingentes rivuli accurrunt, incenduntur om-
 "nia, tument, rubent et interno adore urun-
 "tur, secretionefques largiores evadunt. Om-
 "nes hae calamitates anima intolerabili per-
 "cipit ratione molestiarumque solatia ex coitu
 "petit. Homo, fœcundis onustus humori-
 "bus, eos, ut se ipsam reproducat, circum
 "se spargere cogitur. Veneris servi labores,
 "ne negligentur, eo modo nostræ œconomix
 "sunt intexti ut dulcidine reficiat obedientes,
 "contumaces clandestino igne conficiat. His
 "accedit gratus in coitu sensus, quia conten-
 "tione omnium nervorum, convulsivo mus-
 "culorum motu, calore per omne corpus
 "perfuse et speciali quorundam nervorum

“ titilatione enascitur. Sensus est confusus, a
“ mutata corporis conditione in anima susci-
“ tatus cujus finem fatis, sed minus causas
“ proximiores perspicimus.”

CHAPTER IV.

ANALYSIS OF SENSATION

CONTINUED.

ON THE IMPRESSIONS WHICH YIELD THE
SENSATION OF CORPOREAL PLEASURE
AND PAIN.

PLEASURE and pain, those extremes of sensation; which seem so widely different from each other, but which in reality are very similar, not only in their nature, but also in their causes, are terms often indiscriminately applied to denote certain affections of our nerves, and certain emotions of our mind.

When a person cuts his finger, he is forced to acknowledge, and acknowledges with truth, that it is in the wounded part that he is pained. The affection of the nerve is communicated to the brain, and excites what is called

called a mental perception, that is, he becomes conscious of the injury received. But to say, on this account, that it is the mind which suffers, or, to use the common language of metaphysicians, who in general are extremely ignorant of the human frame, and say, that all pain is only an affection of the mind, appears a most unjustifiable and unphilosophical expression; one might as well assert, that it is the mind which smells, which sees, hears, tastes, and touches. The mind has no suffering whatever from mere bodily pain, except that which it derives in an indirect manner from the reflection, that the bodily injury received may be followed by lamentable consequences. But such thoughts belong to the painful emotions of grief, and are quite distinct from the physical derangement in the structure of the nerves, occasioned by their being forcibly divided.

If, from the peculiar organization of our frame, we are exposed to many causes of painful feeling, we are indemnified, in a great degree, by the enjoyment which we derive from
the

the same source. Fostering warmth gives a pleasurable feeling to a person chilled with cold; the refreshing breezes which succeed the heat of a scorching sun, the sweet scent of odoriferous plants, the gay and varied scenery of the Spring, the usual gratifications of appetite, and the caresses of love, are all proofs which support the assertion.

It is not a valid argument against this opinion to say that such corporeal feelings may be destroyed by mental causes; for instance, that a person by attending to any abstract subject, or in consequence of receiving any agreeable news, appears insensible to the pain of which he loudly complained only a few moments before. It will be proved hereafter, that all mental perceptions occasion sensorial impressions, which correspond with them in strength and duration. But all sensorial impressions, whether derived from a mental or from an external cause, are to be considered as physical affections of nervous matter; and hence it happens that all stronger ones must necessarily impede the transmission of weaker ones; the
sensorial

sensorial impression, therefore, of joy, if it be strong, counteracts those from bodily pain, if these are not very violent.

When we inquire into the nature of the causes which produce bodily pain, we discover a great number, the primary action of which is obvious enough. They evidently derange the structure of the nerves to which they are applied ; thus, all bodies which cut, bruise, or lacerate, occasion pain.

When, of a number of causes, all of which correspond in producing a similar event, the operation of some is once detected, it is natural for the human mind to imagine that all the others also act in a similar manner. Many of the causes of corporeal pain act in a manner which cannot be detected by the evidence of our senses ; such, for instance, as the ichor of certain ill conditioned sores, certain concentrated acids, pure alkalies, many metallic oxyds, and metallic neutral salts ; but as we know that all mechanical stimuli occasion pain, by deranging the structure of the nerves themselves,

themselves, we are led to conclude, that all the others act in the same manner.

The nerves, like every other part of the human frame, are supplied with arteries and veins, and consequently are subjected to all the diseases which the irregular and inordinate action of these vessels occasion. Many causes of bodily pain produce their effects by exciting too great an action in these vessels. In this way all bodies which are capable of exciting inflammation also excite pain. When speaking of stimuli in the chapter on irritability, I endeavoured to prove that many of them produced their effect by altering the chemical texture of the part to which they were applied; and hence the reason why many bodies occasion corporeal pain in a double way, that is, not only by directly changing the chemical constitution of the nerve, but also by causing such an increased action of its vessels, as greatly deranges its structure. In this way all those bodies act which we call *chemical stimuli*.

The

The affection of the nerves, then, which occasions in us the feeling of pain, is always to be considered as a physical derangement of its structure. If that derangement be only momentary, as happens in consequence of a slight blow, the pain is momentary ; if it continues and spreads itself, as is the case when a caustic is applied, the pain is lasting. All corporeal pain, wherever situated, is to be accounted for on similar principles to those explained. There is, however, a passage in the Zoonomia, Vol. i. p. 243, which seems to stand in opposition to this opinion. It is in that part where its celebrated author endeavours to account for the manner in which wine and opium relieve pain. “ In what
 “ manner wine and opium act in relieving
 “ pain, is another article that well deserves
 “ our attention. There are many pains that
 “ originate from *defect*, as well as from excess
 “ of stimulus ; of these are the six appetites
 “ of hunger, thirst, lust, the want of heat,
 “ of distention, and of fresh air. Thus if
 “ our cutaneous capillaries cease to act from
 “ the diminished stimulus of heat, when we
 “ are

“ are exposed to cold weather, or our stomach
 “ is uneasy for want of food ; these are both
 “ pains from defect of stimulus, and in con-
 “ sequence, opium, which stimulates all the
 “ moving system into increased action, must
 “ relieve them.” Why Dr. DARWIN calls the
 “ want of heat,” and the “ want of distention”
 appetites, is left unexplained. In every sec-
 tion of his work the reader, who reflects, meets
 with constant occasion to lament the singular
 abuse of common terms which this author
 falls into ; but a cavil about mere words is as
 foreign, here, to the point at issue, as it is
 unnecessary to its elucidation. The question
 is this, whether the uneasy sensations of hun-
 ger, cold, lust, &c. arise from the mere ab-
 sence of a stimulus, as Dr. DARWIN thinks ; or
 on the other hand, if they arise from the
 direct action of a stimulus. Every circumstance
 seems to prove that the painful feeling of hun-
 ger arises from the action of the gastric fluid
 on the nerves of the stomach : when any thing
 is taken into the stomach on which this fluid
 can act chemically, and which at the same
 time prevents it from being applied in a con-
 centrated

centrated state to the nerves of the stomach, the pain of hunger ceases, nor does the sensation again return until all the food has been nearly expelled, and the gastric fluid is again accumulated in an undiluted state. This fluid is proved to be of an acid nature, and like all acids, it may produce pain upon chemical principles. In many cases it is morbidly secreted in too great quantity, and probably also of a more acid nature than usual, as appears to me to be the case with many young people, subject to acidity in the stomach; such people have a painful sensation of hunger long before their stomach is empty. In such patients, digestion goes on well for a certain time, and then the painful sensation, accompanied with hunger, arises, as if more food was required to dilute the preternatural quantity of acid in their stomach. If they obey the internal monitor, and eat frequently, they are always better than when they patiently sustain the pain until the customary hours of taking food return. In every case, the painful sensation of hunger seems to arise, like all kinds of bodily pain, from the
direct

direct influence of a stimulus, and not from the defect of it, as Dr. DARWIN asserts. People who induce a torpor of the vessels which secrete this fluid, as hard drinkers, seldom experience acute hunger so soon as those who are in good health, and live temperately.

The pain of lust, like the pain of hunger, arises from the action of a stimulating fluid, which, when it is accumulated to a certain quantity, is destined to produce an uneasy feeling in the part where it is secreted. It seems to act chiefly as a mechanical stimulus, for the pain always increases as the epididemis becomes hard and distended. The French chemists say that it has an unpleasant, acrid, pungent taste, and therefore it may occasion pain from its being possessed of such qualities as give these painful sensations to the tongue. If any circumstance prevents the secretion of this fluid, such as severe and long continued exercise, and a poor and scanty diet, the person shall bear the absence of Dr. DARWIN's stimulus with more pleasure than pain.

The

The pain of cold, which Dr. DARWIN ascribes to the defect of the stimulus of heat, arises from the compression which the delicate and pulpy extremities of the nerves of the skin sustain, when the parts shrink by cold. But the contraction of the skin is a mechanical stimulus to these nerves, and this pain, therefore, cannot be said to arise from a defect of stimulus. Nor does any corporeal pain whatever arise in this way. In order to detect the stimulus, however, which occasions it, we must look a little further than to mere external causes.

Many circumstances which produce bodily pain when they are diminished to a certain degree, excite the sensation of bodily pleasure. A moderate degree of heat, and a moderate degree of light, a gentle degree of friction, a cool breeze, when the body is warm, all produce a pleasing sensation; but if the light, heat, friction, and cold, be intense, the effect is painful, or unpleasant. A dish moderately warmed with spices is pleasurable; a dish in which too much pepper is mixed, occasions a
burning

burning pain. Since, then, the exciting causes of these two sensations differ from each other in degree only, it is natural to imagine that the affection of the nerves, which we call pleasure, differs from pain also in degree alone.

This idea is corroborated by investigation. All the causes of bodily pleasure and pain are direct stimuli; such, for instance, as heat, friction, light, well-prepared viands, wines, &c. The first effect which all these naturally produce, is to increase the action of every vessel of the part to which they are applied, and consequently of those which supply the nerves of the part. This increase of motion, or action, in the vessels of these delicate organs may, according as it is gentle or violent, be the immediate cause of the affections of the nerves, which we call pleasure or pain. The increased action of the blood-vessels of the part may also be productive of other effects, which likewise conspire to the production of pleasure or pain. I have said that a number of circumstances prove to us that there is a peculiar fluid secreted in the nerves. Like all secreted fluids, it must be changed by every alteration
in

in the action of the blood-vessels. If the action be only gently increased it will flow more copiously and easily; if the action be diminished, it will be slow. In the first case there is an indescribable state of bodily comfort, ease, or pleasure, which seems to pervade the whole frame; in the latter case there is a degree of nervous uneasiness, which occasions restlessness, and many painful nervous feelings.

The causes which produce the feeling of pleasure in our senses are numerous; they are either repetitions of moderate stimuli, which are of a similar nature, or else a succession of different stimuli which are applied with a gentle force. The first seldom occasion any exquisite feeling of pleasure, except to certain organs of touch. The latter are common to all the senses, touch excepted. All compound dishes yield, in general, more pleasure to the organ of taste than bread, or water, or any simple sapid body. The smell of one flower may certainly be grateful, but we are more delighted by fragrant odours which
come

come in succession from a number of sweet scented plants, than by continuing to smell at one alone; a single note of music often repeated is not pleasurable to the ear, but a gradual succession, and a just combination of notes, allied by musical affinities, are agreeable.

In regard to the eye, which of all our senses seems to be the most perfect, not only in regard to the fineness of the matter, the impressions of which it feels, but also in regard to the variety of objects, of which it conveys impressions to the mind, its pleasures consist either in certain varieties and associations of colours, or in varieties of figure, or in the variations of the shades of light.

Instances of the pleasure arising from bodies in consequence of a variety in their colours, are to be met with frequently in the vegetable kingdom, especially among flowers.

Objects which yield a pleasing feeling to the same organ, on account of a gradual variation

of form, affording successive gradations of light and shade, are also common, and more admired, although mankind in general are not aware of the reason. We speak, at present, of the elegant form of some of the animal kingdom, and more especially of the human species. It is chiefly on this account that the eye finds a delight in viewing the statue of a Venus, of an Apollo, or Antinous.

There is another object of beauty more common than these, the description of which I take from an author of uncommon taste and fancy, whose literary talents will make his death lamented as long as true genius is admired.

“ Observe,” says Mr. BURKE, “ that part
 “ of a beautiful woman, where she is, perhaps,
 “ the most beautiful, about the neck and
 “ breast; the smoothness, the softness, *the*
 “ *insensible swell; the variety of the surface,*
 “ *which is never for the smallest part the same,*
 “ *the deceitful maze through which the un-*
 “ steady

“ steady eye slides giddily, without knowing
 “ where to fix, or whither it is carried.”

When pleasurable stimuli are too long applied, they exhaust the nervous principle, and diminish the irritability of the vessels which secrete it. This physical derangement of the nerve occasions pain. In such instances, it is impossible to say where pleasure ends and pain begins. A certain degree of titillation is agreeable, but if it be long continued it becomes an intolerable pain: the sweetest music, and the most delightful assemblage of objects in a picture, after a certain time become tiresome, and at last painful. On the other hand, many stimuli which at first occasion pain, soon after yield a sensation of pleasure. This happens in consequence of the irritability of the vessels which secrete the nervous principle being so much exhausted, that the fluid is afterwards but sparingly secreted; and hence powerful stimuli are required to produce pleasure.

The irritability of the vessels secreting nervous fluid may only be exhausted for a short
 K 2 time;

time ; and in such cases the stimulus that exhausted them, if it be continued, will create pleasure.

“ An extraordinary young man who lived
 “ at Paris, and who was passionately fond of
 “ mechanics, shut himself up one evening in
 “ his apartment, and bound not only his breast
 “ and belly, but also his arms, legs, and
 “ thighs around with ropes, full of knots, the
 “ ends of which he fastened to hooks in the
 “ wall. After having passed a considerable
 “ part of the night in this situation, he wished
 “ to disengage himself, but attempted it in
 “ vain. Some neighbouring females who had
 “ been early up, heard his cries, and calling
 “ the assistance of the patrolle, they forced
 “ open the door of his apartment, where they
 “ found him swinging in the air, with only
 “ one arm extricated. He was immediately
 “ carried to the lieutenant general of the po-
 “ lice, for examination, where he declared
 “ that he had often put similar trials into
 “ execution, as he experienced indescribable
 “ pleasure in them. He confessed that at
 “ first

“ first he felt pain, but that after the cords
 “ became tight to a certain degree, he was
 “ soon rewarded by the most exquisite sensa-
 “ tions of pleasure.” *Gazette Literaire.*

Upon the same principle, and for the same reason, do all those arts depend, which are employed in the East Indies, China, and other warm climates, to awaken certain pleasant corporeal feelings, such as champooing, tickling the soles of the feet and the ears, &c.

When any pleasurable stimuli have exhausted the nervous principle to a certain extent, we become incapable of bearing the impressions any longer; we then say we are satiated with such a thing, and until the exhausted nerves regain the portion of the principle they lost, we have no desire to experience such feelings again.

It must occur to every reflecting mind, that if stimuli when applied to one part of our nervous system only were capable of exhausting the nervous principle equally from the whole
 of

of it, that the balance of human misery would have been much greater than it really is ; for the satiety arising from any one pleasure, would have rendered us incapable of enjoying any others. But in this particular, as in all others respecting our wonderful œconomy, we have the most direct proof of the greatest wisdom and most benevolent foresight having been bestowed on our construction. The distinct classes of nerves have each a certain quantity of the principle peculiar to them, which requires the repeated application of peculiar stimuli to be exhausted ; and hence, when one organ of sense is fatigued, we are still capable of receiving much pleasure from the others.

When, from the repeated application of powerful stimuli, the nervous principle is habitually secreted in small quantity, then in order to produce the sensation of pleasure, it is necessary to apply such stimuli as would occasion pain in the generality of men. This habitual deficiency of the irritability in the vessels which secrete the sentient principle may be either partial, or general.

As

As an instance of the first may be mentioned chewers of tobacco, takers of snuff, and people who have been accustomed to hot, stimulating dishes. The quantity of tobacco used by the former, and the spices required by the latter, to produce a pleasant sensation in the parts to which they are applied, would excite pain in one whose nerves of the nose and mouth were in their natural healthy state. Upon the same principle are to be explained a number of singularly vicious habits to which men, exhausted by various excesses, and old age, are often addicted. “ Nunc audiemus, Joan Picum. “ Mirandulæ Comitem, qui sæculo abhinc “ uno ac dimidio vixit. Is Lib. iii. contra “ astrologos, cap. xxvii. de familiari quodam “ suo *vivit adhuc, inquit, homo mihi notus, “ prodigiosæ libidinis et inauditæ. Nam ad vene- “ rem nunquam accenditur nisi vapulet. Et tamen “ scelus id ita cogitat ; sævientes ita plagas deside- “ rat ; ut increpet verberantem, si cum eo lentius “ egeret, haud compos plenè voti, nisi eruperit “ sanguis, et innocentes artus hominis nocentissimi “ violentior scutica desævierit. Efflagitat miser “ hanc operam summis precibus ab eâ semper “ feminâ*

“ *feminâ quam adit, præbitque flagellum, sibi ad*
 “ *id officii aceti infusione duralam, et supplex a*
 “ *meretrice verberari postulat: a qua quantò*
 “ *cæditur aurius, eò ferventiùs incalescit, et*
 “ *pari passu ad voluptatem doloremque conten-*
 “ *dit.”* MEIBOMIUS (*de flagrorum usu in re*
venerea,) p. 14.

CHAPTER V.

METHODICAL INQUIRY INTO THE NATURE
AND PHYSICAL CAUSES OF DELIRIUM,
PARTICULARLY THE DELIRIUM
OF LUNATICS.

Evaluation of terms employed; difference between erroneous perceptions, and diseased notions; all men have some erroneous perceptions; the source of these described. The diseased notions of delirious people are of two kinds; their causes. History of maniacal phrenzy; appearances on dissection; new hypothesis concerning its causes. The nature of other maniacal deliria described and accounted for. Hereditary predisposition to insanity taken notice of; in what sense the expression is to be understood. Enumeration of the exciting causes of the various deliria described.

ALL delirious people, no matter whether they be maniacs, or hypochondriacs, or people

ple in the delirium of fever, or of hysteria, differ from those of a sound mind in this respect, that they have certain diseased perceptions and notions in the reality of which they firmly believe, and which consequently become motives of many actions and expressions which appear unreasonable to the rest of mankind.

The expression, *diseased perceptions*, or *notions*, is here preferred to that of *false* or *erroneous perceptions* which is employed by other authors, *first*, because the ideas in all kinds of delirium whatever, arise from a diseased state of the brain, or nerves, or both, as will be satisfactorily proved in the course of this work; and, *secondly*, because the word *erroneous* does not describe any thing peculiar to delirium; for every man, however sane or wise he may be, has some erroneous notions in which he firmly believes, and which often seriously affect his conduct. In the early periods of our lives, and long before we have been taught or accustomed to think for ourselves, we imitatively employ the language of
our

our parents, nurses, and those around us. From them we first learn the names of many external objects, and of the various parts of our own frame, of many of our wants, and of the means of gratifying them. Our curiosity is excited by the fine scenery of nature. We enquire what these things are which present themselves to our sight, whence they come, and for what purpose they are made ; to all which questions we receive such information as the knowledge and inclination to instruct, of the person who answers them, are calculated to afford. Many of these answers are dictated by ignorance, many by a well-intentioned, but very injudicious design to misinform. Now, as by the natural condition of thought, words and ideas are associated together, our mind soon becomes filled with a multitude of erroneous ideas, and loose and inaccurate expressions. How much are we surprised afterwards when a good and liberal education first begins to destroy the veil of ignorance in which we were enveloped, and shews us the many gross errors we formerly entertained? Even then, however, our progress in truth

truth is but slow and limited ; for the very best teachers have many prejudices, and many erroneous judgments, which they instil into our minds. We strengthen ourselves in error by our own presumption ; for we are willing to hazard opinions on various matters, before we are sufficiently acquainted with the subject, and consequently before we have clear ideas concerning it ; and hence we acquire a false logic, to which, when once we become habituated, we find infinite difficulty in improving ; and in many instances it is never afterwards corrected. If these observations are just, the assertion will be granted, that there is no man, however sane, or wise, who may not be supposed to have some erroneous notions, in which he firmly believes, and which often influence his conduct.

The diseased notions which delirious people entertain, are of two kinds :

1st. They are diseased perceptions, referred by the patient to some object of external sense ; as when he believes he sees, hears, tastes, and smells things which have no real existence ;

existence; as when he imagines he sees holes in the wall, through which monsters of various kinds appear in a menacing, or terrifying manner; or when he supposes himself surrounded by dangerous beasts, and serpents.

2dly. They are diseased abstract notions, referable to the qualities and conditions of persons and things, and his relation to them; as when he imagines that his friends have conspired to kill him; that he is reduced to beggary; that he is forsaken by God, &c.

Upon taking a general view of all the more evident exciting causes of delirium in general, without regard to their mode of action, it appears that they may, with much justice, be reduced under the three following heads.

1st. Physical, or corporeal causes; such as too great determination of blood to the head, as in fevers, or intoxication, diseased viscera of the abdomen, poisons, excessive discharges, &c.

2dly. Too

2dly. Too great, or too long continued exertion of the mental faculties, as in the delirium which often succeed long continued and abstract calculation ; and the deliria to which men of genius are peculiarly subject.

3dly. Strong passions, such as anger, grief, pride, love, &c.

Now as there is no evident analogy between these three classes of causes, we are naturally at a loss to conceive how they should agree in their general effect of producing delirium. There must be some common principle, or principles, on which they all act, and by means of which they produce similar diseased phenomena, in the body and mind of many different men. This is the great object of inquiry, in the investigation of which, much patient attention, and an ample, scrupulous, and laborious examination of facts must be submitted to, if we expect to arrive at any useful conclusions.

The

The very ingenious and learned DUFOURS, in his excellent work, already mentioned, dedicates a whole chapter to prove that the diseases of the external senses, by giving rise to erroneous perceptions, produce aberration of reason. I presume to assert, on the other hand, that the diseases of the external senses do not of necessity produce any aberration of mind. This is a point which must be settled before we proceed a step further ; for a great deal of mistake, in regard to the nature of delirium, appears to have arisen from this source. That diseases of the external senses produce erroneous mental perception, must be allowed ; but it depends on the concurrence of other causes, whether any delirium follows.

As the arguments and reasoning of M. DUFOURS on this subject are confined within a narrow compass, I prefer giving a literal translation of the passages to making an extract from them. They are all comprehended in the four first paragraphs of the ninth chapter of his Treatise, and will, if properly considered,

dered, be regarded partly as a series of assertions, partly as conclusions arising from false analogies.

“ §. 114. That which we have now to
 “ add, and the consideration of all that has
 “ been already said in the history of sensa-
 “ tions, enable us to point out the reasons
 “ why all men do not think alike on the same
 “ subject; why they are not all equally capa-
 “ ble of acquiring equal knowledge; why
 “ some men shew a natural propensity to one
 “ thing rather than to another; why some
 “ people easily conceive and execute what
 “ to others is impracticable. From this it
 “ will be further understood why some are
 “ naturally active, lively, gay, and of a pene-
 “ trating wit, while others are slow, sluggish,
 “ senseless, and stupid; why some men are
 “ immoveably attached to their own opinions,
 “ and also what the causes are which induce
 “ them to follow error rather than truth.

“ §. 115. It will be easily seen from this
 “ that we at present speak of the forgetful-
 “ ness

“ nefs and abſence of melancholic people,
 “ &c. circumſtances which are generally af-
 “ cribed to ſome fault of the internal ſenſes,
 “ but which experience proves now and then
 “ to be falſe. I knew a countryman who loſt
 “ his ſenſes becauſe he could not be perſuaded
 “ that the objects he ſaw in conſequence of an
 “ incipient cataract, aroſe intirely from that
 “ complaint. When he found that he could
 “ not remove the dark web which appeared
 “ to him to be conſtantly floating before
 “ his eyes, he fell into ſuch frequent fits of
 “ violent paſſion that he became quite inſane.
 “ But as ſoon as the diſeaſe was completed,
 “ he became more tractable and ſubmitted to
 “ the operation like a reaſonable man.

“ §. 116. It is, moreover, natural to
 “ ſuppoſe, that the reflections of the mind,
 “ which in the moſt of caſes have no other
 “ guide than the external ſenſes, ſhould be
 “ faulty and unreaſonable, when the external
 “ ſenſes, which heretofore ſerved it faithfully,
 “ now go wrong without its knowledge. For
 “ the ſenſes, in ſuch caſes, are like unfaithful

“ servants, who do not perform their duty ;
“ and hence a great deal of confusion and
“ mistake arises in the mind, from its not
“ discovering a want of analogy between the
“ effects of a new and unknown cause, and
“ the former effects of well known and com-
“ mon ones in which it confides.

“ §. 117. The false impressions of the
“ external senses, then, must necessarily
“ create disorder and confusion in a person’s
“ conduct; because it happens most frequent-
“ ly, that they determine his actions. A
“ person trusts to his former experience,
“ which has taught him that bodies are pre-
“ sent when they make an impression on him.
“ Hence many fallacies of the senses, because
“ objects are the causes of his perceptions.
“ Hence also it arises, that we often consider
“ things which are not present to our senses,
“ as present, and as the causes of our per-
“ ceptions : or if there be any thing wanting
“ in an external object, imagination supplies
“ the loss, and represents it as perfect.”

In

In very many instances, the person is conscious of the error of the perception which is present in the mind; and in all such cases, therefore, no delirium takes place. The lady of a very eminent surgeon, in town, had the muscles of her eyes so much weakened by the effects of an antimonial preparation which she had taken, that for some months afterwards she could not direct them with the proper corresponding motions to the same object. The consequence of this was a number of very strange illusions of sight. All objects were seen double, but not always in the same relative situations. Sometimes they appeared above each other, sometimes beside each other: yet no aberration of reason followed. Do we not see every day instances of faulty vision which give rise to very strange imaginary sights? as in incipient amaurosis and cataract, and yet no delirium or aberration of reason arises from them. M. DUFOURS, indeed, in the case related above, supposes the cataract gave rise to insanity; but the very recital of the case shews that the mental derangement did not arise from the erroneous perceptions

which the disease in the eyes gave birth to, but from anger, and fits of passion, which the person fell into from impatience.

In regard to the other external senses, especially *hearing* and *touch*, we find them often diseased, and consequently giving birth to various erroneous mental perceptions, and yet no delirium following. From which it may be concluded, that although one of the most constant phenomena of insanity, and of all *deliria*, is erroneous perception, yet the cause or nature of the delirium is not to be sought for in that circumstance alone.

These preliminary considerations being discussed, we are now prepared to enter into a regular investigation of delirium. Of the remote, or exciting causes of this extraordinary state of the mental faculties, some are very evident, others extremely obscure. Of those which are evident to our senses, some are so constantly falling under our observation, that every person is able to narrate the symptoms which gradually occur, from the
moment

moment they are first applied, until the disorder is formed; the progressive effects of the others on the contrary, are not so easily traced. Among the more evident remote causes of delirium, the progressive effects of which can be easily traced, are, certain powerful stimuli, such as spirits, wines, all strong liquors, and opium. Those which are evident, but the progressive effects of which are not so easily traced, are certain causes arising in many febrile diseases. Of those remote causes which are not only themselves concealed from our senses, but whose mode of operation is greatly obscured, are to be reckoned all those which proceed from hereditary disposition to insanity; and many other bodily causes of melancholy and hypochondriasis.

Order evidently requires that we should begin with those whose mode of operation we can most easily trace, because, if from such an inquiry we arrive at any conclusions concerning their more immediate effects, such conclusions will necessarily serve us
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as the basis for conducting a comparative, or analogical process of reasoning for the rest. I shall therefore begin with the consideration of certain direct stimuli, as causes of delirium; and after taking a cursory view of that which happens in fevers, shall pass on to that of various kinds of insanity, not presuming to draw any general conclusions until all the facts shall have been narrated.

Intoxication, from wine, or spirits, or other powerful stimuli, such as æther, opium, &c. may be divided into three stages.

The *first* is that in which the person has several unnatural perceptions, his judgment, however, remaining still intire.

The *second* is a state of perfect delirium, in which he talks and acts unreasonably.

The *third* a state of coma, or apoplexy.

There is a certain point of intoxication, when a person sees the lights double, and yet
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has so much understanding as to know that it is a mere illusion of sight, proceeding from the wine or spirits he has drank. He has erroneous perceptions, and yet is not delirious : nay, it is by no means uncommon to see some young philosophers, and students, who are accidentally in this state, making the experiment of first shutting one eye, and then the other, with a view of discovering whether they see right or not. At such a period a person is still capable of conducting himself with tolerable propriety, although he generally loses a little command over the muscles of voluntary action. He gives a distinct and rational answer to any question that is put to him, but it is not always very distinctly pronounced. If more strong liquor be taken, a state of real delirium ensues, in which the person talks idly, and unreasonably ; vociferates loudly ; speaks in broken and incoherent language ; emits screams, and ejaculations ; laughs, and swears alternately, and has no command over his actions. If the debauch is continued, he at last falls from his chair in a state which is called *dead drunk*, and which

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is a state of real apoplexy ; or if he has not taken so much as to induce this, the delirium terminates spontaneously in a profound and comatose sleep, from which it is almost impossible to awaken him.

During the whole time that this scene is going on, there is a considerable degree of disorder prevails in the heart and arteries, in which, indeed, the cause of the delirium has generally been sought for. The circulation is much quicker, and stronger than usual ; the pulse rises both in force and velocity ; the heat of the skin is increased ; the face glows, the eyes become red and suffused, and a great determination of blood to the head evidently takes place,

It is well known that in many febrile diseases, which are accompanied with strong arterial action, as in pneumonia, acute rheumatism, phrenetis idiopathica, and measles, a delirium now and then occurs. This delirium is always attended by a number of symptoms, which are analogous to those that arise
in

the delirium of drunkenness ; such as a quick and strong vibrating pulse, increased heat of skin, thirst, and restlessness ; a hot and glowing countenance, eyes vivid, sparkling, and sub-inflamed ; and all the marks of great determination of the blood to the head. In this delirium, the person exhibits signs of uncommon muscular strength, and is agitated by violent passions ; he requires the force of some men to keep him quiet, and his language is generally injurious, and expressive of pain, hatred, or anger.

One would be induced to conclude from all these observations, that a preternatural determination of blood to the head was sufficient to produce delirium ; and, therefore, that this might be considered as one of the more immediate causes of this disordered state of mind ; but a little reflection soon forces us to a deeper research. If a mere increase of circulation of the blood, through the vessels of the head, be a cause of delirium, it ought to arise whenever that occurs ; but this we know is not always the case ; for a person shall have
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the blood preternaturally determined to the head by various kinds of exercise, and his pulse beating 120 in a minute, and yet shall have an understanding as clear and unclouded as when his pulse was at its natural standard. Besides, there are many instances of people labouring under acute rheumatism, and pneumonia, whose pulse beats 120 in a minute for several days, and yet have no delirium. From which it is evident that something else than mere increased determination of blood to the head, and quickness of circulation, is necessary to account for the production of the disease.

Before we hazard an opinion on this subject, it ought to be remarked, that the delirium of many insane persons is very similar, in all its mental characters, to that which has been described; and its history, therefore, by enlarging the field of facts before us, may throw some light on the subject of the proximate cause. The peculiar delirium I allude to is called phrenzy, and is a state of mind into which not only the milder lunatics and
maniacs,

maniacs, but melancholy people also are at times apt to fall.

The method which is adopted in this work demands a faithful account of all the phenomena which precede, accompany, and follow this kind of delirium, to be faithfully narrated, before any speculative reasoning is admitted.

Phrenzy comes on either very suddenly, or else it is preceded by a number of symptoms, which the experienced and observing physician immediately understands.

As an instance of the first kind, the following remarkable case may be adduced. “ I.
“ H. G. a student of Belles Lettres, the son
“ of parents of a melancholic temperament,
“ was, in his early youth, of a calm and
“ tranquil character, appearing free from all
“ cares and uneasiness. Soon after he was
“ put to school, he would, at times, spring
“ up suddenly, give a loud shriek, and run
“ up and down, speaking to himself. After
“ this

“ this he acquired a disgust for science, and
“ became quite melancholy. The following
“ Spring he was calm, but in the year 1765,
“ he at once was seized with phrenzy, and
“ was obliged to be brought to the work-
“ house. This was in the month of May,
“ and in the 23d year of his age, &c.”

GREDDING, *on the use of White Hellebore*. See
his *Vermischte Schrifften*, p. 73.

This case is curious, from its having come on without any evident exciting cause. For in the greater number of instances in which phrenzy suddenly occurs, some evident exciting cause is generally to be discovered; such as certain passions, pride, suddenly created by fortuitous circumstances, anger, and grief, especially from disappointment, &c. Many physical causes also bring it suddenly on, such as too powerful stimuli; for instance, hard drinking, severe exercise in hot weather, sudden transitions from heat to cold, and the sudden retention of habitual discharges, &c.

The

The duration and mode in which the disease terminates, is various according as the person is more or less predisposed to the complaint, and according to the nature of the exciting causes.

It is of shorter duration, and more easily cured, *cæteris paribus*, in those in whom it originates from accidental causes, such as intoxication, sudden transition from cold to heat, the retention of habitual discharges, &c. than in those, who, like the student mentioned, have some disease gradually forming in their brain. That unfortunate young man continued delirious until the year 1771, when he cut his throat, and died.

The phenomena which announce the gradual approach of phrenzy, when its progress is slow, are so faithfully and well described by the late Dr. MONRO, in the sensible and elegant little essay which he wrote in answer to the wild romance of Dr. BATTIE, on the subject of insanity, that I shall give the description of them in his own words.

“ *Higb*

“ *High spirits*, as they are generally termed,
“ are the first symptoms of this kind of dis-
“ order; these excite a man to take a larger
“ quantity of wine than usual, (for those who
“ have fallen under my observation in this
“ particular have been naturally very sober,)
“ and the person thus afflicted, from being
“ abstemious, reserved, and modest, shall be-
“ come quite the contrary, drink freely, talk
“ boldly, obscenely, swear, sit up till mid-
“ night, sleep little, rise suddenly from bed,
“ go out a hunting, return again immediately,
“ set all his servants to work, and employ
“ five times the number that is necessary; in
“ short, every thing he says, or does, betrays
“ the most violent agitation of mind, which
“ it is not in his own power to correct; and
“ yet in the midst of all this hurry he will
“ not misplace one word, or give the least
“ reason for any one to think he imagines
“ things to exist that really do not, or that
“ they appear to him different from what
“ they do to other people. They who see
“ him but seldom, admire his vivacity, are
“ pleased with his fallies of wit, and the saga-
“ city

“city of his remarks ; nay his own family
“are with difficulty persuaded to take proper
“care of him, until it becomes absolutely
“necessary from the apparent ruin of his
“health and fortune.”

This is a true representation of the gradual approach, not of insanity in general, but of that peculiar kind which begins with high spirits ; allowance at the same time being made for the situations of life in which the original was placed, from whom the Doctor has copied his picture. It is evidently taken from a man of fortune and of a good education, who has a family and servants at command. But those who are in different situations in life, and those of the opposite sex, have their conduct marked by different circumstances. The phenomena which are common to all, whatever their sex, or situation in life may be, are these : high spirits, acute sensation, and great vivacity of thought, a disposition to be easily and highly incensed ; or, on the other hand, to be thrown into extravagant laughter from slight causes ; great physical
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cal restlessness, by which a person is prompted to take immoderate exercise, a strong desire for sensual pleasures, by which they are prompted not only to go in search of every amusement, but also of every gratification they can procure, and which renders them totally regardless of their health and fortune; loquacity, and quickness of repartee, and constant agitation of the whole frame; these are symptoms which are general.

Such a person cannot be said, as yet, to be delirious; but that event soon follows, and then he has the symptoms common to such a disease; the only difference being that which arises from the thoughts which are represented in his mind. He begins to rave, and talk wildly, and incoherently; swears as if in the most violent rage, and then immediately after bursts into fits of laughter, talks obscenely, directs offensive and contemptuous language against his relations, and those around him; spits at them; destroys every thing which comes in his way; emits loud and discordant screams, and continues in this way

way till he is quite exhausted. The state of rest which follows is generally short and sleepless; the patient is obstinate; will not speak one word, and clenches his teeth if any thing is offered him to swallow, or else, with a degree of cunning, he pretends to drink a little, but immediately squirts it out on the person who offered it. At once, however, he again breaks out into all the wild and extravagant language, and actions he committed before. If kept in strict coercion, he has often so much command over himself as to behave mildly and modestly, and were it not for the general expression of his countenance, and the peculiar glistening appearance and rapid movements of his eye, he might impose on many of the bye-standers, and make them imagine that the state of phrenzy was over.

This kind of furious paroxysm continues for a longer or shorter period of time in different cases. In some instances, where there is but little predisposition to the disease, and when it has arisen suddenly from some accidental exciting cause, such as a long continued

state of intoxication, sudden transitions from heat to cold, or *vice versa*; or a violent fit of anger, or jealousy, or despair, it is generally of short duration, and easily cured. But when its approach is characterized by the symptoms narrated by Dr. MONRO, and seems to spring more from strong hereditary predisposition than from any evident exciting cause; its duration is generally much longer, and the prognostics, as to the state in which it will leave the patient, always doubtful. It may continue a month, or two months, and upwards. It happens very seldom, however, that it is then characterized by so much violence as has just now been described.

Its termination is various. The most common is in a state of tolerable mental and bodily health. Even those who have a strong hereditary taint often remain perfectly sane for some years after the first attack. Those in whom it has arisen accidentally, from such causes as have been lately mentioned, and who have no hereditary disposition, may remain free from it during the rest of their life. But those

those in whose frame the predisposition still exists, are commonly again attacked with it some time afterwards. In some cases it returns in the course of a few months. These are generally hopeless cases. In others the person may enjoy a state of perfect sanity for one, two, or more years, before any renewal of this melancholy disorder takes place.

A phrenzy, however, is not always followed by longer or shorter periods of lucid reason. Of phrenitic patients, many remain completely maniacal for several months; others fall into a state of deep melancholy; others into idiotism. The particular nature of each of these states will be inquired into afterwards.

Upon inspecting the bodies of those who have died maniacal, or raving mad, a vast variety of diseased appearances have been detected. These are found to exist chiefly in the brain. Numerous are the cases of dissection which have been instituted on the dead bodies of maniacs. BONETUS, MORGAGNI, HERMAN BOERHAAVE, MECKEL, and a few

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others,

others, however, contain every fact of any importance on this subject. Those who have written after their time, have only confirmed the truth of their testimony. The diseased appearances which have been detected within the heads of phrenitic patients, have also been found at times within the heads not only of idiots, and melancholy patients, but also within the heads of many others who never were insane during the whole period of their lives, but who had laboured under various nervous diseases. If any one will take the trouble of consulting the histories of the dissections which MORGAGNI and BONETUS instituted on patients who died lethargic, apoplectic, paralytic, epileptic; of those who had long suffered under hysteria, and those who died of fevers of various kinds, he will find an enumeration of all the diseased appearances of the brain, and its membranes, which have yet been detected within the heads of lunatics, no matter whether phrenitic ones, or melancholic ones, or idiots. Dr. ARNOLD, with much patience and labour, has made a vast collection of histories of dissections, an
account

account of which is to be found in the second volume of his work. GREDING also, in his miscellaneous writings (*Vermischte Schrifften*) has also made a very extensive and well arranged assemblage of facts drawn from respectable sources. As this book is very scarce in this country, and as I cannot add any thing to what he has collected, and by copying from him might give myself an air of unmerited erudition; a literal translation of this part of his work is inserted in the Appendix, where it may be consulted.

Let us now pause a little, and consider all the facts that have been brought forward, and the deductions which may be drawn from them.

1st. We observe that a mere increased determination of blood to the head, provided the circulation be so free that a great congestion does not arise, is not the cause of delirium, since in the cases of severe exercise, and in many fevers, where the pulse beats 120 in a minute,

a minute, and the face is flushed and full, no such phenomenon takes place.

2dly. That an increased quantity of blood sent to the head, or the quickness with which it circulates there, are not the immediate causes of delirium, is further evinced by this fact, that the delirium of fevers, and many cases of phrenzy, begin when there is very little quickness of pulse, and often continue after that symptom is greatly subsided.

3dly. Dissections demonstrate in the clearest manner that although a vast variety of morbid appearances have been detected within the heads of delirious people, especially phrenitic patients, yet there is no one which has been uniformly present in all analogous cases; and therefore there is no reason to believe that any one of them is to be considered as the immediate cause of the alienation of mind, but rather as accidental effects, arising from various causes which have occurred either previous to the commencement of the disorder, or during its attack. Tumors of various kinds, ossifications

cations of arteries, and the membranes enveloping the brain, hydatids, stony concretions, increased vascularity, diminished vascularity, coloured spots, increased density, increased specific gravity; preternatural laxity, ulceration, ruptured vessels, extravasations of blood, lymph, and serum, not only on the surface, but in the cavities and in the substance of the brain; and independent of all these appearances, a vast variety in the form of the skull, has been detected in various cases. The chief circumstance, however, which proves that they are rather consequences than causes of any particular disease, is, that they have been found not only in phrenitic patients, but also in idiots, melancholic patients, hysterical ones, paralytic ones, and epileptic people.

4thly. In all cases of that peculiar kind of delirium called phrenzy, the first phenomenon of disease appears to be a disordered state of sensorial feeling, if the expression be permitted. All impressions on the brain are powerfully felt there. Those derived from the external senses, if they are calculated to excite
any

any desire, or passion, do so in a most uncommon degree; and the reaction of these mental impressions disorder the whole frame. The person acts as if from an involuntary impulse, which does not admit of the operations of reason. Hurry, uncommon strength, bustle, and violence, characterize all the actions and expressions of the patient; every thing creates an uncommon excitement of nervous energy in him.

We have had reason to believe that the medium, by means of which all impressions *ab externo*, are conveyed to the mind, and all those arising in the mind are communicated to the various parts of the body, is a peculiar fluid secreted, or at least formed in the medullary substance of the nerves. This reflection, and the previous conclusions drawn from the premises already laid down, naturally give rise to the conjecture, that the principal cause of such phrenzy and deliria as have been described, must be a peculiar morbid action of the vessels which secrete nervous matter, especially the fluid in question. It may be
altered

altered not only in quantity but quality. This idea is much strengthened by the consideration that the natural and healthy phenomena not only of the whole body, but of single parts, and especially all secreting organs, are much affected by diseased vascular action. One set of symptoms proceed from the mere physical derangement which the uncommon action of the vessels produces on the solid particles in their neighbourhood. Another arises from the changes in the fluids which circulate through them, and consequently in the secretions they perform.

Although the force and quickness with which the heart and arteries act is extremely different in different individuals, and probably also in different parts of the same individual, it is a fair conclusion to say that there is a peculiar one which supports the healthy action of each individual. The expression *diseased*, or *morbid action*, is one by which is meant, in a general sense, all deviations from this healthy action.

It

It is impossible for us to ascertain either the peculiar nature or number of all the diseased actions of which the vascular system is susceptible; far less those which happen to the vessels of particular parts in various diseases. The difference that exists in the natural action of various parts, is by no means understood. Of morbidly increased arterial action, one kind is peculiar to gout, another to acute rheumatism, another to venereal inflammation, another to scrophulous inflammation, another to erysipelas, &c. Now, although it is natural to suppose that in general the action of the remote branches of the arterial system may be supposed to correspond with that of the larger arteries, yet we have undoubted proof that this is not always the case. Their action is often altered in many very remarkable degrees, without any corresponding change of action in the heart, or system of larger blood-vessels. This is proved by cases of topical inflammation of all kinds, in which the healthy appearances of the part affected are all changed, and yet the circulation in general goes on as usual. It is also proved

proved by many diseases of the skin, by secondary venereal sores, scrophulous tumours, &c. In many cases, indeed, of topical diseased arterial action, the system at large is deranged, but in such cases it is not owing to the diseased action becoming general, but to a number of secondary causes; that is to say, the topical disease, produces a certain number of events; these become the cause of others, and these others of a third series, and so on. Thus, certain diseased actions of the vessels of the liver not only produce uneasiness there, but also cause the bile to be much changed from its healthy state, both in quantity and quality; and hence a certain number of morbid effects, pain in the stomach, nausea, vomiting, faulty digestion, and loss of appetite, colic pains, and violent purging. These, if they continue for any length of time, produce headach, heat of skin, thirst, great languor, and restlessness, and at last cramps in the extremities, and convulsions, &c. So the diseased action of the vessels of the brain, which give rise to phrenzy, operate in a similar manner. An altered state of feeling
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in the brain is evident in the quickness and vividness of the eyes, the irascibility and the disordered state of the mental faculties; the patient's insensibility to cold, and also his depraved appetite, &c. These, if they continue, produce want of sleep, slight febrile paroxysms, a furious and ungovernable conduct, wild and incoherent expressions, and so on.

But if the action of the vessels which secrete the sentient principle, be greatly altered from their healthy state, the fine fluid which is secreted must undergo proportionate morbid changes. In order to prove the effect which any unusual change of the fluids has on the mental operations, I shall insert a singular fact, mentioned by DIONIS in the 498th page of his *Cours d'Operationes de Cbirurgie*. He speaks of a practice which was at one time attempted to be introduced, with a view not only of preventing, but curing many diseases.

The fact he speaks of is the transfusion of blood from certain animals into man. The event,

event, however, was terrible; for a great number of those on whom the experiments were made became furiously mad, and soon died. The parliament of Paris having gained intelligence of these experiments, issued a decree, by which it was forbidden, under the most severe penalties, to repeat such experiments. His words are these: “ Ils firent
“ plusieurs de ces operations qui devoient se-
“ lon eux, avoir un succès surprenant; mais
“ la fin funeste de ces malheureuses victimes
“ de la nouveauté détruisit en un jour les
“ hautes idées qu’ils avoient conçues; ils de-
“ vinrent foux, furieux et moururent ensuite.
“ Le parlement informé de ce que s’étoit
“ passé interposa son autorité, et donna un
“ arrêt par lequel il étoit défendu sous des ri-
“ goureuses peines de faire cette operation.”

This fact is brought forward, not with a view of inspiring the idea that the delirium of maniacs arises primarily from a vitiated state of the fluids, but merely to prove that when the fluids are altered, no matter what the cause

cause be, they always change the action of the vascular system.

Upon the whole, I conclude that the delirium of maniacs, when it has the peculiar character of that which has been described, always arises from a specific diseased action of those fine vessels which secrete the nervous fluid in the brain. This diseased action appears to be one which, independent of its specific nature, by which it is distinguished from common inflammation, or scrophula, is a preternaturally increased one; and this I think is proved by the quickness of the external senses, the irascibility of mind, the heat of the skin, the flushed countenance, and uncommon energy of body which maniacs evince. This hypothesis explains the reason also why it often has periodical exacerbations, and remissions. They who believe that tumors, ulcers, and ossifications of the brain, or increased specific gravity, or increased hardness of the same, give birth to mania, must necessarily be at a loss to explain why the delirium ever ceases while such causes exist ;

exist; but if it arises from diseased action, it must cease, and may, or may not return, according as a variety of other circumstances conspire to its re-excitement.

All the phenomena of the phrenzy of maniacs are either diseased feelings, or aberrations of the mental faculties.

That diseased feelings should arise from diseased action of the arteries of the brain, or of the nervous system, is easily understood, since in fact every change in the physical state of the nerves produces of itself a diseased sensation; and independent of this, it necessarily alters all impressions of external bodies which are transmitted through these parts.

Upon what general principle the aberration of the mental faculties is to be accounted for in such cases, by those who believe the mind to be essentially distinct from the brain, will be shewn in the Chapter on Memory, in which this curious inquiry comes more naturally before us than at present.

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The fine vessels of the brain and nerves which secrete the fluid principle, on which sensation depends, must be subject to all the laws of irritability which regulate the action of the other vessels of the human body. If they are capable of being excited into too great action, whether it be of a specific kind or not, they are also subject to torpor after it.

But if the principle on which sensation depends be too scantily secreted, delirium may arise; for in this case impressions, *ab interno*, are weakened before they reach the mind, and consequently those which spring up there from the association of ideas, or which are excited by diseased bodily feelings, acquire a disproportionate vivacity; that is to say, without being stronger than they are in general, they appear more vivid, on account of the weakness of the impressions of external objects. The patient, therefore, naturally believes that they have a real existence, and his discourse and actions spring from this source.

In

In such a delirium, attention is greatly and necessarily diminished, and therefore the ideas are not so permanent as in maniacal phrenzy, where the patient is often agitated by one thought only for a considerable length of time; hence the images which present themselves to the mind of those who labour under this low kind of delirium, are often transitory, and their discourse is consequently very incoherent.

Such a low kind of delirium frequently occurs in all the varieties of *typhus*, and often also in consequence of profuse hæmorrhages, and discharges, when accompanied with a quick pulse, and other symptoms of fever. The patient is naturally restless and unruly, because his ideas prompt him to be so; his language is querulous, but not offensive.

There is a low delirium which follows the state of phrenzy in maniacs, that is nearly allied, in its mental character, to that which occurs in low fevers. But there is a very great difference between the two

patients in regard to other circumstances. The maniac with low delirium can use immense muscular force ; the febrile patient, on the other hand, is incapable of using much exertion. In the febrile patient the irritability of the whole frame is exhausted by the general quickness of circulation, and increase of heat, which accompanies the complaint from its beginning ; but mania being a local disease, and not accompanied by any very uncommon quickness of pulse, the irritability of the muscles seems often to be preternaturally accumulated. These maniacs are often ungovernable, except by means of coercion, but they are more easily restrained than those who are in a state of phrenzy. They are intractable, and neither listen to intreaty or to menaces. Fear of corporal punishment, however, makes them obey. They willingly avoid the light, burying themselves under the bed-clothes, or under the straw of their cells. All external impressions are greatly weakened in them before they reach the brain ; and hence such patients are for the most part insensible to cold, for many of them will remain almost :

almost completely naked during the severity of the winter. They are totally regardless of decency and cleanliness, and from some strange motive are often found rubbing themselves all over with their excrement. The sensation of hunger and thirst, like every other natural bodily feeling, is weak, and they therefore appear to have little appetite; but their power of concoction is seldom impaired, for, if they are made to eat, they seem to digest the food well. When their keepers, however, present it to them, his appearance and expressions destroy the feelings of hunger, and they therefore often obstinately refuse to take it; and yet when left alone, and the instinctive sensation of hunger returns, they will greedily devour their *fæces*.

What the nature of the ideas are which present themselves to their mind, it is impossible to know; for although they generally mutter something to themselves, it is in so low a voice as not to be heard.

It appears to me that such patients often experience bodily sensations which are ana-

logous to the impressions that excite the feeling of corporeal pain; for they now and then emit loud screams and howlings, which are singularly expressive of great suffering.

The time that they are to remain in this peculiar kind of delirium can rarely be foretold with accuracy. In some patients it continues for many months, and after a longer or shorter period is always succeeded either by a gradual return of health, or by another paroxysm of phrenzy, in which the patient talks loudly, and incessantly as formerly, and is also again agitated with fresh violence and fury. It is worthy of remark that those who are most furious in the state of phrenzy, are most sullen, gloomy, and insensible in this second stage of mania.

During the whole of this term the irritable organs perform their offices rightly. The heart and arteries, stomach and intestines, ureters and bladder, and all the vascular system, are in a state of good health.

There

There is a kind of mania which is quite distinct from any thing that has been yet described. Like phrenzy, it seems to arise from a specific increased action of the vessels which secrete the sentient principle ; but at the same time it seems to be a distinct kind of action. It is not of so violent a degree, and consequently the paroxysm generally continues longer, and is not succeeded by a great state of torpor. It would appear as if the impressions which this diseased action of the vessels of the brain produces, were more analogous to those of corporeal pleasure than of pain, for the patients are all happy, gay, and cheerful. Although they are not insensible to external objects, their thoughts are generally more vivid than the impression from these, and hence it seldom occurs that their attention can be fixed on external things for any length of time.

So far from being averse to society like the maniacs who were last described, they hate solitude. They are lively, active, and extremely loquacious ; the women, especially,
talk

talk incessantly. They are fond of all strong liquors, take snuff with avidity, and are very libidinous. The most modest young females who it might be supposed had never heard an improper or indecent expression in their life, when unfortunately seized with this complaint seem suddenly to be inspired with the sentiments and dialect of a loose libertine.

Good humour characterizes this insanity, and hence the patients are in general very tractable.

The ideas which prevail most in their minds are various and whimsical. They belong to the pleasurable passions, and are most commonly inspired by vanity. The men are kings, emperors, popes, lords, and bishops, or else men eminent for some great talent. Sometimes they are faithfully attached to the characters which they at first assume, and uniformly maintain it for a considerable length of time; but this is by no means generally the case. In the 8th Vol. of the Psychological Magazine, the mental character of a young harmless

harmless lunatic of this class who became mad from disappointment in love is minutely described. " He at one time imagined himself
" a great general, and then he always appeared
" armed, and decorated the outside of his
" habitation with a large flag, to show it was
" the head quarters of the army. At another
" time he was a monk, and then he used to
" go about barefooted, and covered only
" with a white cloak. As he is very con-
" versant in church history, his imagination
" often made him believe that he was John
" the Baptist, or the apostle Peter, &c."

Women are almost uniformly ladies of distinction and fashion, and seldom forget to decorate themselves with every thing which they consider to be an ornament, and to exact or solicit attention.

This very peculiar kind of delirium is often of long duration. Now and then it is succeeded by lucid intervals; now and then, though rarely, by phrenzy.

The

The diseased action of the vessels of the brain which occasions that kind of delirium which is called lunacy, or insanity, may arise from various causes.

Before we enumerate the exciting causes, it is necessary to say something concerning the predisposition to this melancholy disorder.

Every medical man possessed of a moderate share of experience, must have observed that the children of those who have been insane are more liable to attacks of delirium, and alienation of mind, than the descendants of other people; insomuch that where a numerous family has sprung from parents who are tainted, it rarely happens that insanity is not produced in some of that family during part of their lives, by any slight exciting causes. If they marry and beget children the same thing is also observed among them. This fact makes us conclude that many have an hereditary right, or in other words are born with a predisposition to the complaint.

When

When a phyfician fays that a perfon has an hereditary right to a complaint, he does not mean that that perfon fhall infallibly be feized with it in the courfe of his life. He may efcape having it if he is fo fortunate as to efcape being expofed to all the caufes which are neceffary to excite the morbid action of the veffels of the brain in which it confifts. All that is to be underftood by the term is, that fuch a perfon is much more liable to have the difeafe than a perfon who is not born of tainted parents. Caufes which will not produce any mental diforder whatever in the one, are quite fufficient to bring it on in the other.

That children often inherit the caft of features, the form of perfon, the tone of voice, the temperament, and mental character of their parents, are eftablifhed truths. Since this is the cafe, therefore, it does not furely require any uncommon ftretch of genius to fuppofe, that the internal vifcera of a child, fuch as the ftomach and intefines, kidneys, bladder, liver, brain, and alfo the more minute parts of its frame, fhould alfo partake of the fame inheritance; and
that

that a child, therefore, should often resemble its father or mother, or have a joint resemblance to both, as much in the secret organization of its frame as in its external character. Such a conformation entitles a child to a similitude of diseases or unhealthy actions as those to which its parents were subject, provided it be exposed to the common exciting causes of such complaints: and hence we find that the children of gouty, rickety, scrophulous, consumptive, and insane people, are more disposed to be affected with gout, rickets, scrophula, consumption, and insanity, than the children of healthy parents. That people were disposed to certain diseases from birth as well as from the operation of accidental causes, was an observation, or a mere matter of fact which was taken notice of by the Greek physicians, who denominated this cause of disease *προηγυμενη*; but a certain inaccuracy of expression, in regard to predisposition, has introduced itself into the writings of many medical men since these early times, and has induced them to call certain diseases *hereditary diseases*. This inaccuracy has probably been caused by

the constancy with which the influence of hereditary disposition operates ; but it gave occasion to the late Mr. JOHN HUNTER to ridicule the expression, and to assume the old observation of the Greeks, as one of his own discoveries ; and many of his pupils, who have very few of his eminent qualities, but who imitate him in self-esteem, have endeavoured to confirm this victory over modern physicians, by ascribing the merit of the observation to him, and by their praises in its favour.

People who have no hereditary taint may at once become insane if the exciting causes are powerful ; but it is also to be remarked, that a predisposition may be formed in such as have no hereditary taint, by the continued operation of a number of causes. It is a certain fact, for instance, that men who have sustained certain injuries on the head, and people who drink hard, are very apt to become delirious. It is also greatly to be suspected that after a person has once been attacked with a real phrenzy, that the texture of the brain, and the natural arrangement of its vessels, are thereby altered from

from their healthy state, and that the morbid organic effects which follow, greatly predispose a person to the renewal of the complaint.

The unusual hardness, specific gravity, dryness, and toughness of the brain, and the various tumors, corrosions, enlargements of particular parts, ossifications, and adhesions of the membranes, &c. are often the consequence of the morbid action of insanity; but while they are thus to be considered as mere effects, they are also to be looked on as causes which, by constant irritation, predispose the vessels of the brain to the renewal of the delirium. Another class of causes which greatly predispose a person to disorders of the mind, are various kinds of debility, such, for instance, as arise from poor diet, bad drink, scrophula, over-fatigue of body, excess of venery, self-pollution, excessive hæmorrhages, and excessive discharges.

The exciting causes of the various deliria which are considered as cases of insanity, are very numerous.

They are either,

I. *Pow-*

I. *Powerful Stimuli.*

A. Excessive heat, especially the too long continued action of the rays of the sun on the head.

B. Immoderate exercise, especially in hot weather.

C. Sudden transitions from cold to heat, by which the irritability of the vessels of the brain, like those of the whole body, is first accumulated, and then violently excited.

D. Sudden transitions from heat to cold, by which a preternatural quantity of blood is thrown into the head, and acting as a violent mechanical stimulus.

E. Over-exercise of the mental faculties.

F. The passions, when violent.

G. Powerful stimuli applied to the stomach, such as

1. Wine,

1. Wine, spirits, and all strong liquors :
2. Opium, and other powerful narcotics, as they are commonly called.
3. Cantharides, and other aphrodisiacs.

H. The translation of various inflammations, and other diseased actions to the brain, particularly those which constitute and accompany cutaneous disorders.

II. *Diseased nervous impressions, conveyed from distant parts of the system to the brain.*

These diseased nervous impressions may either be diseased actions of the parts themselves, or they may arise from irritating bodies applied to them.

It is impossible to reduce these under the form of a table, for in fact they may occur in any part of our frame. A delirium similar to lunacy has been known to arise from a sprain, from a fractured bone, from a bullet having been lodged among the external muscles of the body, as well as from worms in the intestines ;

tines; from ulcers in the uterus, and from various diseases of the viscera of the abdomen.

The first class of causes may be considered as being more particularly the exciting causes of pure insanity.

The second class of causes, especially those arising from diseases in the stomach and intestines, give rise to the temporary delusions which are peculiar to hypochondriacs. The history of this complaint, therefore, properly belongs to this place.

CHAPTER VI. INQUIRY CONTINUED.

OF DELIRIA FROM MORBID NERVOUS IM-
PRESSIONS. THE HISTORY OF
HYPOCHONDRIACS.

THE progress of hypochondriasis is slow, and insidious. Long before any alienation of reason takes place, a number of symptoms, evincing a deranged state of bodily health occur; and if these are alleviated, or removed in time, no delusion follows: from which it appears that the disease is not primarily seated in the brain. The viscera of the abdomen appear to be the most common source of this melancholy disorder, as appears from its history. It is by no means easy to discover which of them is chiefly in fault, in any particular case; far less can we discover what the peculiar nature of that faulty state is. Most
of

of the symptoms indicate a disordered state of stomach and intestines ; but the functions of these organs are affected by such a multiplicity of morbid causes, and in such a variety of ways, that this only increases the obscurity that surrounds us in our inquiry. The person is for many years troubled with flatulency, irregularity in the alvine discharge, and faulty digestion. Some have acidity in the stomach, others have a feeling there which makes them imagine the food to be converted into an oily or rancid kind of fluid. Such patients generally inform their medical attendant, that the contents of their stomach give them the idea of a pot of fat, boiling, or fermenting. The air which is evolved in the stomach produces great distention of that organ, and this distention is always accompanied by an uneasy feeling, and sense of anxiety. The patients are, for the most part, of a costive habit; now and then they are seized with a sudden diarrhœa. It is, however, seldom critical, or serviceable. It exhausts the strength of the patient, leaves him low and dejected, and is

frequently accompanied and followed by irregular spasmodic contractions of the muscles of the abdomen, which MANDEVILLE makes his patient, MISOMEDOM, describe as “tensions, snatchings, thumpings, and pulsations in the belly.”

Hypochondriacs are sometimes affected with a bilious diarrhœa. They are very subject to the hæmorrhoids, from which they often lose great quantities of blood. The flatulency with which they are now and then greatly tormented, is at times disengaged from the ill-digested food; at other moments it seems to be secreted from the inner surface of the stomach itself. That which affects the intestines produces borborygmi, colic pains, and, frequently, occasions a number of curious sympathetic affections, such as slight convulsions, and subfultus tendinum, especially of the abdominal muscles. These circumstances are often the sources from which the diseased perceptions of the patient arise. The noise which the air makes

makes in the intestines, and the subsultus tendinum of the muscles of the abdomen, give birth to the idea that some living animal is within them, or that they are possessed of evil spirits. PLATERUS, Vol. I. . i. p. 43, relates the case of a young physician, who firmly believed he had living frogs within him. I myself knew a female hypochondriac who believed she had a whole regiment of soldiers within her; and THOMAS BARTHOLINI, in his *Hist. Anat. Rar.* mentions the case of a student of divinity, who mistook the noise of flatulency with which he was troubled, for an evil spirit who infested him.

Hypochondriacs often void a wheyish, or milky-white coloured urine, which always announces a great weakness and disorder in the chylopoetic viscera. At other times they make great quantities of a pale-coloured, and limpid urine. This generally occurs upon any agitation of mind, or hurry of spirits. Cold sweats, which alternate with flushes of heat, especially in the face and hands; the globus

O 2

hystericus,

hystericus, and fainting; dizziness, deafness, tinnitus aurium, and sleepless nights, are frequently met with in the advanced stages of the disorder. The patient generally feels a much more oppressive sensation of weakness and fatigue than is natural, considering the muscular strength he is capable of exerting. Certain symptoms of debility, which in another person would hardly produce any disagreeable effect, for instance, sudden distention of the stomach, slight palpitation, or colic, instantly occasion all the alarming feelings of fear and apprehension, and these are accompanied with a degree of anxiety which cannot be described.

That some people are more disposed to hypochondriasis than others, is a fact which is proved by daily experience. It appears that the principal seat of the predisposition is to be sought for, not only in weak organs of digestion, but also in a preternatural nervous sensibility; for we often meet with cases of dyspepsia, and disordered stomach and bowels, which have continued with a patient for
many

many years, and yet no real hypochondriasis follows. I know several people who have laboured upwards of twenty years under stomachic complaints of various kinds, and who notwithstanding have never had any hypochondriacal symptoms.

These facts give rise to the conjecture that there must be other diseased actions going forward in hypochondriacs, than those which occur in the viscera of the abdomen; and this conjecture is confirmed by a great number of phenomena which are constantly to be observed in such people. They have many painful feelings in parts where no disease apparently exists, and they have many diseased perceptions which command their belief, and greatly add to the general sum of their misery.

A number of the most distressing feelings which hypochondriacs complain of, are often external pains, seated immediately under the skin, and in parts which, when examined, appear to be in a sound state. Sometimes the pain is in the middle of one or two of
the

the ribs, sometimes in the middle of the leg, thigh, or arm, sometimes in the back, and also in various parts of the head.

These painful feelings are generally transmitted from impressions in the stomach and intestines. But their being transmitted in such an unnatural way, proves a very disordered state of the nerves. They are most frequent when the patient is troubled with indigestion, flatulency, costiveness, or colic ; and what is very remarkable, the external pain is often increased by pressure. I have, at present, a gentleman under my care, who is also attended by my friend, Mr. LYNN, who suffers exceedingly from these false pains. If the finger is pressed upon the part it generally brings on spasms in the organs of respiration, and occasions so much agony, as to make him scream aloud ; after the pressure is taken away the pain ceases. These pains are constantly shifting their place, and often wander over half of the patient's body in the course of the day.

The

The mental character of hypochondriasis consists principally in great dejection of spirits, inability of attending to worldly affairs, a constant anxiety about their own health, and an unremitting attention to every new sensation. After a certain time, which is longer or shorter, according to a great variety of circumstances, diseased perceptions suddenly arise. These either relate to the state of the patient's body, or mind, or else to their property, or, lastly, to certain people, or various external objects.

To attempt an enumeration of all the extravagant ideas which enter into the minds of such people would be fruitless, since they are as various as every unnatural combination of natural ideas can be. Some who belong to the first class think their extremities and posteriors are made of glass, others that their legs are soft as wax ; some think they have no heart, others that they have no soul, others fancy they are dead, and others that they are changed to monsters ; the pains of poverty, the persecution of enemies, the effects of
secret

secret vengeance, and of calumny, are all common ideas with hypochondriacs, especially if there be a little mixture of true melancholy with it, which is often the case.

It appears to me that very little good, in regard to practice, is likely to result from confining our observations to the nature of the erroneous ideas which infest the minds of such people, except, inasmuch as some of them, now and then, throw a little light on the first cause of the disease.

In order to make this assertion intelligible, it is necessary to observe, that, although hypochondriasis may be justly said to arise from a disordered state of the viscera of the abdomen, yet it is also often brought on by affections of the mind, such as deep and long continued grief, and melancholy. These mental affections produce hypochondriasis by creating a disorder in the stomach and intestines, and in the nervous system; so that in every instance it arises either directly or indirectly from this source. According as it happens

happens in one or other of these ways, the disease assumes a slight variation of mental character ; but as this is merely accidental, it makes no essential difference in regard to the real nature of the complaint.

When hypochondriasis arises primarily from diseased viscera, the erroneous ideas which present themselves to the mind generally concern their own frame ; but when it has primarily arisen from melancholia, then the morbid ideas are for the most part unnatural, or at least unreasonable fancies either concerning other people, or their own worldly affairs ; for the passions which give birth to and accompany melancholy, are commonly the most prevalent in their mind. When melancholy is described, which cannot be until mental pain and grief shall first have been treated of, this observation will then appear in a more striking point of view.

Nothing can be more interesting to a physician who is endowed with only a moderate share of the spirit of observation, than the progress

gress of this complaint in a number of patients, especially in regard to its effects on the mind. They always struggle, more or less, in the beginning, with the lowness and dejection which affect them; and it is not until many a severe contest has taken place between their natural good sense, and the involuntary suggestions which arise from the obscure and painful feelings of their diseased nerves, that a firm belief in the reality of such thoughts gains a full conquest over their judgment. A firm belief in any perception never takes place until it has acquired a certain degree of force; and as all impressions which arise from the viscera of the abdomen are naturally obscure, we see the reason why these must continue for a great length of time, or be often repeated before they can withdraw a person's attention from the ordinary impressions of external objects, which are clear and distinct, and before they acquire such a degree of vividness as to destroy the operations of reason.

We meet every day with hypochondriacs, in whom the disease is just beginning to be
formed,

formed, and who being possessed with the remains of a good understanding, seem unwilling to tell, even to their medical friends, the singular and often melancholy thoughts with which they are tormented. They acknowledge them to be unreasonable, and yet insist on it they cannot help believing in them. A very curious display of this kind of struggle, between the habitudes of reason, and the approach of delirium, is to be met with in the diary of an hypochondriac ; various extracts from which were sent to the editors of the Psychological Magazine, and are published in the 8th Vol. part 2d, p. 2, of their work. Some of these are so remarkable, that it is hoped they will not prove uninteresting to the reader.

“ On the 14th of November, the idea that
“ some person intended to kill me, sprang up
“ suddenly and involuntarily in my mind, and
“ yet, I must confess, there was no reason
“ why I should have harboured this thought,
“ for I am convinced no one ever formed such
“ a cruel design against me. People who had
“ a stick

“ a stick in their hands, I looked on as mur-
“ derers. As I was walking out of the town,
“ a countryman happened to follow me, and I
“ was instantly filled with the greatest appre-
“ hension, and stood still to let him pass. I
“ asked the fellow in a threatening voice,
“ and with a view of intimidating him from
“ his purpose, what was the name of the
“ town before us. The man answered my
“ question, and walked on, and I found great
“ relief, because he was no longer behind me.

“ In the evening I observed some water in
“ the glass out of which I commonly drink,
“ and I instantly believed it was poisoned. I
“ therefore washed it carefully out, and yet
“ I knew at the same time, that I myself had
“ left the water in it.

“ 18th Nov. The effects of the nuptial
“ embrace on my mind, gradually grow
“ more singular, insupportable, and dan-
“ gerous. It is not that I find myself weak-
“ ened by it, on the contrary, I always feel
“ myself, at first, lighter, more cheerful, and
“ better

“ better disposed for scientific inquiry. I
“ also observe, that at such times I have much
“ happier and wittier thoughts than at any
“ other; but, alas! this state of mind and
“ body does not continue long. For such
“ moments of connubial tenderness I after-
“ wards pay dearly, by long-lived days of
“ mental inquietude. I am then dreadfully
“ out of humour, and believe that all man-
“ kind have conspired to murder me. I
“ think I am deprived of my office, that I
“ am doomed to die for hunger, and to add
“ to all this, I am tormented with horrid
“ doubts concerning futurity, and these
“ thoughts persecute me like furies. Those
“ whom I was wont to love most, I now
“ hate: I avoid my best friends, and my dear
“ wife appears to me a much worse kind of
“ woman than she really is.

“ I cannot describe the exertion it re-
“ quires to conquer, in society, the aversion
“ I feel to my fellow creatures; and to pre-
“ vent my ill humour from breaking out
“ against the most innocent people. When
“ it

“ it really does so, I spare no one ; I am sorry
“ for it afterwards, but then I am too proud
“ to acknowledge my error.

“ I find myself so enraged on seeing a
“ stupid, vacant countenance, that I have an
“ almost irresistible inclination to box the
“ person's ears to whom it belongs ; the re-
“ fraining from it is a severe effort.

“ 20th Nov. A boy with a face like a
“ fatyr met me, and occasioned me the great-
“ est uneasiness. Although he did nothing
“ to displease me, I was forced to go to him,
“ and tell him that I was sure he would die
“ on the gallows.

“ 23d Nov. My sensibility is often ex-
“ treme, and then my best friends become
“ insupportable to me. To their expressions
“ of regard I am either purposely cold, or
“ else I answer them by rude and offensive
“ speeches. I can seldom explain to myself
“ the reason of this too great sensibility. If
“ two people whisper each other in my pre-
“ fence,

“ fence, I grow uneasy, and lose all command
“ of mind, because I think they are speaking
“ ill of me; and I often assume a satirical
“ manner in company, in order to frighten
“ them. Anxiety, dreadful anxiety, seizes
“ me if a person overlooks my hand at cards,
“ or if a person sits down beside me when I
“ am playing the harpsichord, &c.”

This history proves, in a very convincing manner, the truth of the observation, that the person often struggles, as it were, with the disease of his mind, until it at last gains such an ascendancy over him as totally to overthrow his reason. Nor is this to be wondered at; for as soon as the faculty of restraining ones thoughts, and of attending to the comparisons which the power of reason employs, is greatly weakened, the suggestions which are excited in the mind by the diseased feelings, must necessarily be believed in.

The circumstance which appears the most unaccountable to people who have not thought deeply on the subject, is the fact, that the
source

source of the illusion generally lies in the abdomen. Some light may be thrown on this at present, but it is probable that it can only be rendered perfectly clear by an attentive perusal of the succeeding parts of the work, in which many analogous facts are explained.

Most of the objects which surround us have been examined by several of our senses; we have compared the various sensations they have yielded and these, therefore, become associated in our mind, so that if any external body thus examined, be again presented to only one of our senses, the idea of all its various qualities is recalled, and we necessarily believe in their reality. The sources of almost all our perceptions, while we are in health, lie in external objects; for the nerves of the external senses are the only ones of our whole frame which convey clear impressions to the intellectual part. Hence we acquire a natural habit of ascribing all strong impressions to some external cause. In cases, therefore, where the cause of the sensation cannot be examined,

examined, a false judgment may easily arise. The languor and pain, and various uneasy sensations which a hypochondriac feels, naturally withdraw his attention from surrounding objects, and as the exercise of his judgment is weakened by the same circumstances, he does not examine the unreasonable ideas with accuracy when they are first presented to his mind. Painful feelings are associated with melancholy thoughts ; and new and uncommon feelings, upon the same principle, are ascribed to strange and uncommon causes. The weakness, therefore, which a hypochondriac feels in his limbs makes him imagine they are unable to support him; but if they cannot do so, he concludes they must bend or break: the idea of fragility, or flexibility, however, is often derived from such substances as wax, and glass, and he therefore, believes that his limbs are made of some kind of similar materials.

“ A painter of considerable reputation in
“ his art, imagined that all his bones were
“ become so soft and pliant that they must

VOL. I.

P

“ necessarily

“ necessarily bend like wax, if he attempted
 “ to walk, or if any hard body was struck
 “ against them. In conformity with the fears
 “ which such a notion inspired, he kept his
 “ bed during the whole winter, imagining
 “ that if he arose, his legs would be com-
 “ pressed by his own weight into a lump like
 “ clay, or wax.” *Tulpius*. (Obs. Med. Lib. i.
 cap. 18.)

“ A baker, of Ferrara, believed he was
 “ made of butter, and on that account would
 “ not approach the oven lest he should
 “ melt.” *Marcus Donatus*. (Hist. Med.
 Rar. Lib. ii. cap. 1.)

Dejection of mind, and melancholy, beget
 fear and apprehension, and the emotion of
 these passions being associated with horrid
 thoughts, the fancy is crowded with pictures
 of impending danger, for the feelings he ex-
 periences are exactly similar to those he has
 formerly felt from fear or terror. As to
 the causes which induce him to think that
 the danger is threatened by one person, or
 by

by some persons rather than by others; or which make him imagine that it arises from a supposed ruined state of his fortune, rather than from any other source, they are often of such a trifling nature as to escape common observation; a look, an unguarded expression, over-strained, or officious attention to his wants, inattention and disregard of his wants, a change in the mode in which his business is conducted, &c. are all sufficient to give birth to such conceits, while he is affected with languor, weakness, and diseased feelings.

The singular notions which hypochondriacs entertain, may now and then be eradicated from their mind by means of a little art; but there is seldom any real good to be derived from this, except the disease be at the same time cured; for if diseased impressions continue to arise in the mind from the disordered viscera, other illusive notions will spring up as soon as one set is destroyed.

“ The wife of one SALOMON GALMUS
“ imagined there was a living monster within

P 2

“ her,

“ her, which inhabited certain parts which
 “ are peculiar to her sex. Of this conceit
 “ she was cured by the cunning and dexterity
 “ of her physician. But she soon afterwards
 “ conceived another notion which was not
 “ to be removed with such facility. She
 “ thought she had been dead, but that God
 “ had sent her back to the world with-
 “ out a heart, for he had kept it in heaven.
 “ On this account she was extremely unhap-
 “ py, and more miserable than any of God’s
 “ creatures.” *Tulpius*. (Obs. Med. Lib. 1.
 cap. 19.)

In other cases the diseased notions are
 so deeply rooted, that the greatest address is
 necessary to disengage them from it; for if
 it be done in such a manner as brings no
 conviction to the patient, that he is really
 cured of his imaginary malady, the effect
 is generally of the worst kind. A person,
 “ of the name of VICENTINUS, believed he
 “ was of such an enormous size that he
 “ could not go through the door of his
 “ apartment. His physician gave orders
 “ that

“ that he should be forcibly led through it,
“ which was done accordingly, but not with-
“ out a fatal effect, for VICENTINUS cried out
“ as he was forced along, that the flesh was
“ torn from his bones, and that his limbs
“ were broken off, of which terrible impres-
“ sion he died in a few days, accusing those
“ who conducted him of being his murder-
“ ers.” *Marcus Donatus.* (Hist. Med. Rar.
Lib. ii. cap. 1.)

the city of London, from the first
 settlement of the Saxons, to the
 present time. The first part of the
 history, from the first settlement of
 the Saxons, to the reign of King
 Edward the Confessor, is taken
 from the Anglo-Saxon Chronicle.
 The second part, from the reign of
 King Edward the Confessor, to the
 present time, is taken from the
 History of Henry of Huntingdon.
 The third part, from the reign of
 King Henry of Huntingdon, to the
 present time, is taken from the
 History of Matthew Paris.

The fourth part, from the reign of
 King Henry of Huntingdon, to the
 present time, is taken from the
 History of Matthew Paris.

The fifth part, from the reign of
 King Henry of Huntingdon, to the
 present time, is taken from the
 History of Matthew Paris.

The sixth part, from the reign of
 King Henry of Huntingdon, to the
 present time, is taken from the
 History of Matthew Paris.

The seventh part, from the reign of
 King Henry of Huntingdon, to the
 present time, is taken from the
 History of Matthew Paris.

The eighth part, from the reign of
 King Henry of Huntingdon, to the
 present time, is taken from the
 History of Matthew Paris.

The ninth part, from the reign of
 King Henry of Huntingdon, to the
 present time, is taken from the
 History of Matthew Paris.

The tenth part, from the reign of
 King Henry of Huntingdon, to the
 present time, is taken from the
 History of Matthew Paris.

The eleventh part, from the reign of
 King Henry of Huntingdon, to the
 present time, is taken from the
 History of Matthew Paris.

The twelfth part, from the reign of
 King Henry of Huntingdon, to the
 present time, is taken from the
 History of Matthew Paris.

The thirteenth part, from the reign of
 King Henry of Huntingdon, to the
 present time, is taken from the
 History of Matthew Paris.

The fourteenth part, from the reign of
 King Henry of Huntingdon, to the
 present time, is taken from the
 History of Matthew Paris.

The fifteenth part, from the reign of
 King Henry of Huntingdon, to the
 present time, is taken from the
 History of Matthew Paris.

The sixteenth part, from the reign of
 King Henry of Huntingdon, to the
 present time, is taken from the
 History of Matthew Paris.

BOOK II.

THE
NATURAL HISTORY
OF THE
MENTAL FACULTIES,
And a Description of the
DISEASES
To which they are subject ;
OR,
A CONCISE SYSTEM
OF THE
PHYSIOLOGY and PATHOLOGY
OF THE
HUMAN MIND.

Nos qui sequimur probabilia, nec ultra quam id quod verosimile occurrerit progredi possumus ; et refellere sine pertinacia et refelli sine iracundia parati sumus.

Non enim fumus ii, quibus nihil verum esse videatur : sed ii qui omnibus veris falsa quædam adjuncta esse dicamus, tanta similitudine, ut in iis nulla insit certa judicandi et assentiendi nota, ex quo existit et illud, *multa esse probabilia.*

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CHAPTER I.

ON THE MIND IN GENERAL.

TANTA EST EJUS TENUITAS, UT FUGIAT ACIEM.
CICERO Tusc. Disp. Lib. i.

The danger of attempting to pass the limits of human understanding; the idea of an universally diffused soul embraced by some modern writers; the principle which gives rise to such a notion explained, and proved to depend on very loose analogies. General view of the physical properties of bodies; proofs that there is not one elementary matter. The principles explained on which the more common physical properties of bodies depend. The phenomena of mind investigated; the mind has faculties and principles; distinction between these. The nature of mind examined, Dr. PRIESTLEY's hypothesis invalidated. Facts and arguments which shew that the
mind

mind is distinct from any part of our frame which is evident to the senses. What conclusions are to be drawn from these facts.

THE attempt to define the nature of the mind, or soul, is as vain and presumptuous an undertaking as it is to try to find out, by thought alone, the nature of the Almighty : or whether he existed before time, or had himself a beginning. We have no means of throwing any light on such subjects as these, inasmuch as we have neither any direct facts, which explain them, nor have we even the most distant analogies to justify and direct speculation. Whether we elevate our thoughts to heaven, and consider the various constellations which enlighten the firmament, in the hope of discovering its wonderful fabric, or depress them to the globe which we inhabit, and analyze the many objects it presents to our senses ; whether we take a grand and comprehensive view of the whole frame, and structure of the world, or examine with a curious and inquisitive eye, the minuter parts of
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which it is composed, we shall find on every hand certain boundaries, beyond which it is impossible to penetrate either with success or safety.

The limits of human reason are clearly marked, and may be easily discerned by every inquirer, with whatever ardor his researches be conducted, provided his judgment be not fascinated by the passion of pride, or not incumbered with the strange and irremovable prejudice, that the powers and perfection of man have no limits.

The conclusions, indeed, which are drawn concerning the more hidden secrets of nature, by some great luminaries of the present age, are done with so much apparent ease and quickness, as to shew that they have not run any very great hazard from an over exertion of thought. As soon as a few analogies only have been discovered between some of the more obscure phenomena of the natural world, a supposition seems instantly to have arisen in their mind, that the cause of these phenomena must
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be similar. The conjecture is not examined with caution, but is immediately erected into a splendid hypothesis.

Many of the Greek and Roman philosophers, because they could not account for a number of wonderful events, which they observed in the natural world, supposed the whole of them to depend on the agency of one active principle. The motion of the heavenly bodies; the shooting meteors of the sky; the ascension and precipitation of water; the heat of animals, their motions, instincts, procreative powers, and intellectual faculties; the growth of plants, their states of watching, and sleep, their life, and death; and many other objects of philosophical wonder, gave rise to the notion, that one divine energy, or common mind, was diffused throughout, and animated the whole world.

Principio cœlum ac terras, camposque liquentes
Lucentemque globum lunæ, titaneaque astra,
Spiritus intus alit, totamque infusa per artus
Mens agitat molem, et magno se corpore miscet.

VIRG. *Æn.* vi.

Although

Although many of the phenomena which induced the ancients to believe in the influence of one generally diffused soul have been fully explained by modern science, and shewn to arise from a number of very different causes, yet the general doctrine has been embraced by many distinguished writers of the present age, especially by PLATTNER, in his *Anthropology*, p. 46; by HERDER, in his *Philosophy of the History of Mankind*, B. I. p. 170; and by Dr. DARWIN, in various parts of his beautiful poem, entitled, the *Botanic Garden*, and in his *Zoonomia*. Although the belief of these authors has not arisen from the difficulty of explaining the same facts which influenced the minds of the ancients, yet the notion seems to have sprung up from the same kind of general principle. Obscurity, in regard to the causes of certain phenomena, has been often looked on as the proof of similarity; and when any number of appearances, therefore, are discovered, which cannot be easily referred to any well known source, the imagination is apt to ascribe the whole of them
to

to the influence of one which is occult, or hidden.

Dr. DARWIN has thought he has discovered a certain resemblance between the phenomena of irritability, sensibility, and mind. He has increased this belief by a fanciful conjecture concerning the motion of nerves; and from these circumstances, it would appear, he has been induced to think that the three principles just now mentioned are only modifications of one and the same energy, which he calls spirit of animation.

In the investigation of such a subject as that of mind, we must not rest satisfied with the looser analogies which seem to captivate men of lively fancy, and restrain them from further inquiry. Let us examine the properties of bodies with as much attention as we can, and see how far the analysis leads us.

However various the appearances may be which are to be observed in different bodies, yet there is one quality which is common to all of them, I mean form or structure. We
imagine

imagine that the form of bodies arises from the arrangement of a vast number of imperceptible atoms, or particles, which we choose to call by the general name of *matter*.

As these atoms to which we give the name of matter, are never objects of sight, or of any of our senses, except when they are in a state of arrangement, and forming bodies, so we can have no knowledge of their real nature.

Every individual substance which constitutes a part of the globe which we inhabit, has a form of structure peculiar to itself. Thus the arrangement of particles, which compose a granite, a piece of basalt, a serpentine, a piece of quartz, a calcareous spar, a piece of gold, lead, or iron, &c. is different in each body. Several bodies are evidently composed of mixed materials, and we observe that every variety of mixture gives them a variety of form, or appearance, from which we conclude that there are a great variety of elementary matters which compose the individual

vidual substances of which the earth is constructed. This conclusion is confirmed by the aid of chemistry, for in analyzing bodies we discover a number of simple elementary principles, each of which has distinct properties.

Not only a difference in the number and kind of elementary parts of a substance produce an alteration of form or structure, but the slightest variety in the proportion of the ingredients does the same thing even where they are similar in kind. Thus the calcareous spar (native crystallized carbonate of lime) when its ingredients are in a certain proportion constantly assumes a rhombic form: it is of no consequence where it comes from, whether from Peru, or the Hartz, from Cumberland, or Chemnitz; but if the slightest alteration takes place in the number or proportion of the ingredients, there immediately arises a deviation in the figure of the substance: it is then crystallized, either in a rhombic form, the acute and obtuse angles of which are different from those of the primitive rhomb, or else the particles which are superposed on the
rhombic

rhombic nucleus are deposited in such a manner as to give a new mathematical form to the substance; thus, of this spar we have no less than near five hundred different varieties of the rhomb, all of them depending either on a variety in the number of their elementary parts, or on their proportions. The proof of this assertion is to be found in the celebrated work of Mons. ROMÉ DE L'ISLE, intitled *Essai sur la Crystallographie*; and in the various Memoirs of that acute and deep investigator of nature, the Abbé HAUY; and in the superb collection of models of crystals, made by my friend, the scientific and amiable Count de BOURNON, and presented by him to the Hon. CHARLES GREVILLE, in whose possession they now are.

Independently of mixture, number, and proportion of the elementary parts of dead bodies, their external appearance and internal structure are greatly owing to the mechanical attraction which the integrant molecules have for each other.

Now on these causes most of the physical properties of inanimate bodies depend, such as the form or structure, hardness or softness, gravity or levity, roughness, smoothness, colour, &c.

It may be laid down as an axiom *that every variety in the natural form of an inanimate or dead body, arises from some change in the number, kind, or proportion of the elementary parts of which it is composed, and on the mechanical attraction which the molecules have for each other at the time of its formation*; or, in fewer words, these qualities depend solely on the influence of chemical mixture and mechanical attraction.

Inanimate bodies are of two classes; they are either dead vegetables, and animals, or the individual substances which compose and surround this globe.

The two former differ from the latter in being organized, that is, they have distinct parts, or organs, each of which perform different offices, while the bodies are alive. In
regard

regard to the mere structure or form of these organs, it is to be remarked, that if they differ much from each other, this arises from the influence of similar causes to those on which the difference in the physical qualities of various minerals depend, namely, on the number, kind, and proportion of their elementary parts.

If the texture, organization, and other physical qualities of bone, are different from those of ligament, and those of ligament different from those of membrane, and those of membrane different from those of muscle, skin, or cellular substance, &c. it is because the elementary parts of each are different, either in kind, or proportion, or both.

There have been philosophers who imagined there was but one kind of primitive or elementary matter ; and there have been others who, adopting this notion, appear to have rejoiced that they did not stand higher in the scale of nature than a piece of granite. But every fact which experience yields is opposed

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to

to such a conjecture. The composition of organic bodies is more various than that of inorganic ones; the materials are of a finer kind, and are of a much more difficult analysis; and although chemistry is greatly improved within these few years, we are at this moment far from being sure that we have detected all the grosser elements of which the dead bodies of animals are composed. We can imitate nature to a great extent in forming mineral substances, but we can by no means imitate, by means of chemical composition, the appearance, or structure, of the simplest vegetable, far less those of animals.

Animated organic bodies, such as living animals and vegetables, differ from the dead ones inasmuch as they exhibit a vast variety of phenomena, which cannot be accounted for on the principles by which we have attempted to explain the qualities of inorganic ones. Some of these have been fully investigated in the chapters on irritability, and sensibility. In the mineral kingdom nothing similar to such principles is to be detected. They mark
the

the limits at which all analogy between the dead and the living world cease.

The mind of animals remains to be examined. In doing this, let us recollect how much real wisdom there is in confining our researches within the boundaries by which Nature has surrounded human thought. Let us confine ourselves as much as possible to a plain detail of facts and observations. I have hitherto endeavoured, in this chapter, to carry the analogy which exists between the dead and the living world, as far as facts and fair reasoning will permit, lest it might be said that in the disquisition which is to follow, I had thrown them intirely aside.

When the head of an animal is cut off, every phenomenon of the mental faculties ceases; but this is not the case with those which depend on the more common principles of animal life (irritability, and the nervous principle) for these continue to exert their influence for some time afterwards. In those animals which seem to have the least
mind,

mind, such as the cold-blooded ones, these common principles continue to excite their energy the longest; thus a frog will leap and crawl about for many hours after its head is cut off; and certain butterflies complete the act of generation after having suffered the same cruel treatment. (See Appendix, No. 3.) These facts, and the consciousness which attends all mental operations cause us to believe that there is a certain point, or place, within the head, where all nervous sensations terminate, and where they unite and become objects of perception and thought. That thing which perceives them, as it were, we call *mind*, or *soul*, in contradistinction to the word *brain*. That part of the brain which we call the optic nerve, cannot either perceive, or compare the sensations which are peculiar to the nerves of the ear; those of the ear cannot perceive, or compare those which are peculiar to the tongue, or nose; those of the tongue, or nose, cannot compare those of the nerves of the skin; but to this indescribable something, called mind, it is quite indifferent whether the sensations are received by the optic nerves,
or

or the auditory ones, or by those of the nose, or palate. It can compare them all with each other; those of sight with those of touch, and those of sight and touch with those of hearing, &c.

The mind has faculties and principles, but this is a circumstance which has not hitherto been remarked sufficiently by any writer on psychology.

The word *faculty* ought to be accurately distinguished from the word *power*, with which it is too often confounded, not only in conversation, but in writing. People speak of the powers of the mind, when they mean its faculties, and *vice versa*, they speak of faculties when they mean powers. Every man who is not an idiot, and in good health, is possessed of similar *faculties* of mind with the rest of mankind who are also sane, and in good health of body; but no one man, perhaps, has similar *powers* of mind with another. Every man is endued with the *faculty* of memory, but some men possess the *power* of

of memory in a much higher degree than others; every man can judge, but the *power* of judging seems to be very unequally distributed.

The number of the mental faculties is by no means agreed on by philosophical writers. Some enumerate five only, viz. the faculty of forming ideas, or perception; the faculty of associating ideas; the faculty of remembering them; the faculty of imagining; and the faculty of judging. But other writers add to these the faculty of conceiving, and those of abstracting ideas, and of combining them. This point cannot be settled without entering into a minute investigation of the phenomena of each of these faculties; and as this is done in the succeeding chapters of this book, there is no necessity for repeating what is therein contained.

Independently of the faculties which have been mentioned, the mind is endued with two other properties which, in my opinion, ought to be called *principles*. The difference between

tween the faculties and the principles of the mind is this ; the faculties modify the sensorial impressions in a great variety of ways, giving them new characters, and qualities, and converting them into objects of thought and reason, just as the functions of the body change the food into a variety of new matters which have many distinct properties from the food as it is received into the body. The principles of the mind, on the other hand, do not modify the sensorial impression, but are excited into action by them ; and their action is transferred to the faculties, just as the living principles of the body (irritability and the nervous principle) do not act on the food and blood, and on external bodies, but are excited into action by them. The two principles of the mind are *consciousness* and *volition*.

Consciousness does not modify our thoughts, neither does volition do so ; but memory, imagination, and judgment, all operate on our perceptions, giving them different characters.

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In regard to the essence, or nature of that *something*, which is endued with these faculties and principles, three different opinions are entertained by speculative philosophers. The first is that the mind, and brain, are one and the same substance. The second is, that the mind, or soul, is corporeal, but of a very different kind of matter from that of brain. And the third opinion is, that mind is an immaterial something designed by the word *spirit*.

Of all species of materialism, that one appears to me to be the most completely absurd which is founded on the supposition that brain and mind are one and the same substance. Yet this doctrine is embraced by one who has added more useful facts to science, and more ornaments to philosophy than almost any other modern writer. (a)

It

(a) In the preface to Dr. PRIESTLEY's celebrated work on Matter and Spirit, when speaking of the motives which induced him to think deeply on the subject, he says, " Continuing to reflect upon the subject, I became satisfied that, " if we suffer ourselves to be guided in our inquiries by " the

It is not to be expected that I should enter fully into the merits and demerits of all the arguments which Dr. PRIESTLEY has brought forward in support of his favourite opinion. Many of them are of such a nature as to be founded entirely on the notions he himself entertains about the primitive qualities of matter. But this is a subject which will ever remain a question of controversy ; since it cannot be determined by any facts, what these are, and consequently there can be no ground for general conviction. Of two men who embrace different opinions concerning matter, one may indeed refute the other, but this will be no proof that the one who has gained this conquest has himself discovered the real truth, or that his notion is less fanciful ; it only evinces that he has built a system on better grounds than his antagonist. Matter and spirit are terms almost equally unintelligible in themselves. We have never seen that princi-

“ the universally acknowledged *rules of philosophizing*, we
“ shall find ourselves unauthorized to admit any thing in
“ man besides that *body* which is the object of our senses.”

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ple of bodies, which philosophers understand by the word matter, any more than we have seen that which they denominate spirit. We define it to be that of which all bodies are composed; but this definition does not throw any more light on its real nature, than the definition of mind explains what the essence of mind is. We have the folly to ascribe to matter a number of qualities, but which, when properly considered, are only the properties of bodies. Two hard bodies cannot occupy the same space at the same time; and the principle on which this depends we call *solidity*. Bodies occupy space, and we say they have *extension*. All bodies move towards each other when no obstacle is in the way; and the principle on which we say this depends, we call *attraction*. These conclusions in our mind we transfer by analogy, to matter, although we know nothing about it, and we say it is solid, and possessed of attraction, and that it has extension.

In order to demonstrate the great danger of such reasoning, or rather such assertions
(for

(for it does not deserve the name of reasoning), we have only to read Dr. PRIESTLEY'S work already alluded to ; and see into what a dilemma he brings himself by a similar mode of arguing. He, indeed, denies solidity and extension to be qualities of matter, and defines it to be mere centres of attraction and repulsion. He is evidently well aware that the mind of man cannot have a clear notion of what is meant by a centre of attraction or repulsion, as a property of matter, but by supposing some very minute atom placed there, which is endowed with the qualities of attraction and repulsion ; but as this notion would completely refute the conclusion he wishes to draw from it, he takes care repeatedly to affirm that the centre which attracts and repels, has not the dimensions of a physical point ; and that it has no kind of solidity or extension ! (See his *Dissertations on Matter and Spirit*, p. 16.) In the name of common sense, what is this thing ? Is there less absurdity in calling that a spirit which is thus divested of every corporeal quality, than in calling it matter ? If ever there
was

was a boundary put to human understanding, it is here.

Let us now turn our attention to another series of Dr. PRIESTLEY'S arguments, on which the mind can dwell with safety, and which are capable of being understood. " Had
" we formed a judgment concerning the ne-
" cessary seat of thought, by the circum-
" stances that universally accompany it, which
" is our rule in all cases, we could not but
" have concluded that in man it is a property
" of the *nervous system*, or rather of the *brain*;
" because, as far as we can judge, the faculty
" of thinking, and a certain state of the brain,
" always accompany, and correspond to an-
" other; which is the very reason why we
" believe that any property is inherent in any
" substance whatever. There is no instance
" of any man retaining the faculty of think-
" ing when his brain was destroyed; and
" whenever that faculty is impeded, or in-
" jured, there is sufficient reason to believe
" that the brain is disordered in proportion :
" and

“ and therefore we are necessarily led to con-
“ clude the latter as the feat of the former.

“ Moreover, as the faculty of thinking in
“ general ripens and comes to maturity with
“ the body, it is also observed to decay with
“ it; and if, in some cases, the mental facul-
“ ties continue vigorous when the body in
“ general is enfeebled, it is evidently because
“ in those particular cases the brain is not
“ much affected by the general cause of
“ weakness. But, on the other hand, if the
“ brain alone be affected, as by a blow on the
“ head, by actual pressure within the skull, by
“ sleep, or by inflammation, the mental fa-
“ culties are universally affected in proportion.

“ Likewise, as the mind is affected in con-
“ sequence of the affections of the body and
“ brain, so the body is liable to be recipro-
“ cally affected by the affections of the mind,
“ as is evident in the visible effects of all
“ strong passions, hope or fear, love or an-
“ ger, joy or sorrow, exultation or despair.
“ These are certainly irrefragable arguments
“ that

“ that it is properly no other than one and
“ the same thing that is subject to these affec-
“ tions, and that they are necessarily depend-
“ ent upon one another. In fact, there is
“ just the same reason to conclude that the
“ powers of sensation and thought are the ne-
“ cessary result of a particular organization,
“ as that sound is the necessary result of a par-
“ ticular concussion of the air. For in both
“ cases, the one constantly accompanies the
“ other; and there is not in nature a stronger
“ argument for a necessary connection, or any
“ cause and any effect. To adopt an opi-
“ nion different from this, is to form an
“ hypothesis without a single fact to support
“ it.” P. 27, et seq.

This last sentence contains a false charge, since it may be safely said, that to adopt the opposite opinion to Dr. PRIESTLEY's, is to form an hypothesis which is founded on a multiplicity of well established facts, which he has either been ignorant of, or has not duly considered. The history of dissections proves that the texture of every part of the
brain

brain may be morbidly altered from its natural state, and yet all the faculties of the mind remain entire. The writings of the learned, industrious, and modest MORGAGNI, and those of BONETUS, and HALLER, contain many cases of this kind. Portions of the brain have been forcibly detached by cutting instruments; great excavations have been formed in it by abscesses; schirrous, or scrophulous tumors, near two inches in length, have been found in it; fungous tumors have arisen from its surface; all its arteries have been found ossified; its coats have been variously diseased; the interior part of the cerebrum, and of the cerebellum, the basis of the cerebrum, the pituitary gland, the pineal gland, the plexus choroides, have all been found exhibiting morbid changes of structure in people who were in full possession of their internal senses. There is a work in the hands of most literary men, (or if it is not in their hands, can be easily procured,) where a great number of these cases have been industriously collected with a view of proving the same thing which is now advanced; it is there-

fore deemed unnecessary to fill this chapter with the recital of them. The work alluded to is the *Memoirs of the Literary and Philosophical Society of Manchester*, in the first volume of which there is a paper of a very learned physician, Dr. FERRIAR, wherein the cases referred to by HALLER are all collected and translated.

If I were desired to say, in a general way, what those cases of diseased brain are which most commonly produce disorder in the mind, I should answer, they are those in which the arterial action of the brain itself is altered from its healthy state; as, for instance, in fevers, and general and local inflammations of various kinds. The reason of this has been attempted to be explained.

As soon as the altered action begins to subside, the healthy operations of the mental faculties return; and, although the diseased state of circulation often produces permanent mischief in the brain, such as tumors, &c. yet these may be formed, and may continue for years, without

without affecting the senses. In regard to the point at issue, therefore, what conclusion can be drawn from such facts? In favour of materialism, the only one is this, viz. that it is not the substance of the brain which is mind, but the blood, or the fluids secreted from it in the brain!

Another argument which Dr. PRIESTLEY adduces in favour of the *corporeality* of mind is this, that our faculties decay in proportion as the body grows old and infirm; but this, like many other general assertions, has full as many facts opposed to it as those which are brought forward in support of it.

If it can be proved that most people who duly exercise the memory, imagination, judgment, and all the other mental faculties, gradually improve in mind, whilst the body is decaying, and sinking into the grave, it is surely more than a presumptive proof that the elements of the soul (if I may be allowed the expression) are quite distinct from the materials of which the body is composed. In support of

this proposition, an authority of high name, and unbiaſſed by any of the ſhallow ſystems of modern times, may be brought forward. CicerO, in his philoſophical and very beautiful Eſſay on Old Age, mentions many inſtances of men poſſeſſing the full vigour of their intellects after their phyſical force was nearly exhausted, and accompliſhing works of great fame at a very advanced period of their lives. The firſt he takes notice of is *QUINTUS FABIVS MAXIMVS*, a man of conſummate wiſdom, and of more erudition than the Romans at that time in general poſſeſſed. His ſon died after he had obtained the conſular dignity, on which occaſion he compoſed a celebrated funeral oration; and CicerO, when he mentions this, takes the opportunity of paſſing an eulogy on the mental powers of this diſtinguiſhed old man. “ Multa in eo viro præclara cognovi;
“ ſed nihil eſt admirabilius quam quomodo
“ ille mortem filii tulit, clari viri et conſu-
“ laris: eſt in manibus laudatio, quam quum
“ legimus quem philoſophum non contemni-
“ mus! Nec vero ille in luce modo, atque
“ in oculis civium magnus; ſed intus, domi-
“ que

“ que præstantior ; qui sermo ! quæ præcepta !
 “ quanta notitia antiquitatis ! quæ scientia
 “ juris augurii ! multæ etiam, ut in homine
 “ Romano, literæ ! Omnia memoria tenebat,
 “ non domestica solum, sed etiam externa bel-
 “ la ; cujus sermone ita tam cupide fruebar
 “ quasi jam divinaram id quod evenit, illo ex-
 “ tincto fore unde discerem neminem.”

CICERO mentions many other facts of great importance in the present question. PLATO died while composing a work in his eighty-first year. ISOCRATES finished his *Panathenæicus* in his ninety-fourth year, and his teacher, LEONTINUS GORGIAS was equal to all the ordinary employments of life at the very advanced age of one hundred and seven !

Were not all the ancient governments supported and maintained by old men ? In order to be a magistrate of Lacedæmon it was necessary to be far advanced in life. “ Old age (says CICERO) “ does not extinguish genius,
 “ provided active study be not abandoned.
 “ Quid jurisconsulti ? quid pontifices ? quid
 “ philosophi

“ philosophi senes ? quam multa meminerint !
 “ manent ingenia senibus, modo permaneat
 “ studium, et industria ; nec ea solum in cla-
 “ ris et honoratis viris, sed in vita etiam pri-
 “ vata et quietâ. Sophocles ad summam se-
 “ nectutem tragœdias fecit ; quod propter
 “ studium, quum rem familiarem negligere
 “ videretur, a filiis in iudicium vocatus est,
 “ ut quemadmodum nostro more male rem
 “ gerentibus patribus bonis interdici solet ;
 “ sic illum, quasi desipientem a re familiari
 “ removerent iudices. Tum senex dicitur
 “ eam fabulam, quam in manibus habebat, et
 “ proxime scripserat, Œdipum Coloneum re-
 “ citasse iudicibus, quæsisseque, num illud
 “ carmen desipientis videretur ; quo recitato,
 “ sententiis iudicum est liberatus.”

But as recent examples are generally more
 striking than ancient ones, I shall borrow a
 few facts from the unfinished page of biogra-
 phy. And, first, let our attention be turned
 to an author, who, in whatever light his poli-
 tical principles and career may be viewed,
 doubtless claims a first place in the pantheon
 of

of Genius. Although weighed down by misfortunes of the most afflicting nature, and enfeebled by old age, and by bodily disease, we have seen him lately shine forth as one of the most brilliant meteors which has illuminated the horizon of modern literature. It is surely unnecessary to mention the name of Mr. BURKE. Can any one suppose for a moment that the mind of that man made a part of his decayed frame? Do not his last publications evince a vigour of intellect not only uninjured by time, but even superior for the splendor of language, the vividness of imagination, and richness of thought, to those which were composed in the meridian of his life? Are not Lord MANSFIELD, Dr. SAMUEL JOHNSON, VOLTAIRE, and the author of *Zoonomia*, and the *Botanic Garden*, direct proofs that the mind continues to improve after the body begins to decay? Bishop BURNET, for the last forty years of his life, was a martyr to the stone, and a complication of bodily diseases, yet during that time he composed many of his best writings. Sir ISAAC NEWTON, when near his eightieth year, resolved, as an amusement

amusement for the evening, the celebrated problem of the trajectories which LEIBNITZ had sent to this country, in full expectation that it would puzzle the first mathematician of the age. It is said that Sir Isaac undertook it one evening after his return from the Mint, where he had been actively employed the whole day, and that he finished it before the morning.

All these facts prove that the phenomena and qualities of mind depend on a substance of a very different kind from brain, or any other part of our frame, which is evident to the senses. And this fact being proved, we must conclude, agreeably to the strict rules of philosophizing laid down by Sir ISAAC NEWTON, and so warmly recommended to the attention of philosophers by Dr. PRIESTLEY, that the mind must be either a matter of a different kind from brain, or else a something which it has been attempted to define by the word spirit.

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It may be further observed in regard to this question, that it is impossible to conceive, agreeable to the strict rules of philosophy, that any body should operate on itself in such a manner as some of our thoughts operate on brain; producing delirium of various kinds.

It is necessary to observe, for the sake of justice and candor, that, although it can be proved that the phenomena of mind are quite distinct from those which seem to belong to brain and nerves, yet this by no means settles the original question concerning the materiality or immateriality of the soul. Although essentially different from brain, it may still be matter. Those who think thus, hope to find an apology for their opinion in arguments drawn from analogy. The uniform experience of mankind, they say, teaches us that nothing can act on matter but matter.

“*Tangere enim et tangi, nisi corpus, nulla potest res.*”

LUCRET.

But

But as human reason is inclined by a natural condition of thought to build its opinions upon the facts which experience yields, so the notion that the influence which acts on the brain and nerves, and produces the external phenomena of mind, must be a physical influence, forces itself involuntarily upon the conviction of many. Those who think that it is not matter, do not found their opinion on argument, but belief. The evidence of our senses, the principal source of our knowledge, does not teach us any fact similar to this. The doctrine of immateriality is therefore a subject of faith, not of reason.

It may be worth while, before we relinquish this subject, to take a concise view of the various conclusions to be drawn from the facts and arguments which have been adduced in treating it.

After the physiologist has carried his inquiry as far as possible into the nature and effects of irritability, and nervous sensibility, as well as into those of the mechanical and chemical powers

powers which operate on the human body, he still meets with many phenomena which he cannot account for by the known influence of these agents. All the impressions received on the external extremities of nerves to which we give the name of sensations, are conveyed to the head, and seem to unite there in one point. Their production in the nerves, and their transmission along them, the physiologist can tolerably well account for; but as soon as they arrive at the place alluded to, new phenomena occur, which are totally dissimilar from any thing depending on the organization of brain, or nerve: a thought arises! an idea is present to his mind, which makes him conscious of the existence of the external body which acted on him! He endeavours to collect all the observations which these new phenomena yield, and after having done this, and having found that he cannot account for them by the knowledge he has obtained of nervous matter, he naturally refers them to an occult cause which remains to be examined. He discovers, by means of many facts, that this occult cause is acted on by external bodies, through

through the medium of our senses ; and on the other hand, he observes also, that it re-acts on the brain, and on the corporeal part of man, inasmuch as a single thought often alters every healthy action of the body : a power, however, must reside in something ; it must have a subject. It cannot be brain ; for in no instance whatever does a body act on itself so as to alter its natural phenomena. But the mind does this in regard to the brain ; a thought alters the whole of its action ; he is therefore persuaded that there is something in man distinct from brain, to which the phenomena of mind are to be ascribed. The next step is to find out its nature ; but here he sees himself surrounded by innumerable difficulties : it may perhaps be distinct from brain, and yet corporeal. This supposition leads him to investigate what that is which is called *matter*, and he soon discovers, if he is not tainted with any hypothesis, that he cannot acquire a clear idea of its real nature from experience. It is not an object of sense. He is told that the occult cause is a *spirit*, or immaterial substance. Here he is totally at a loss ; but when he reflects on the term, and how the notion of *spirit* should have arisen

arisen in the mind of man, he begins to doubt whether the consciousness which all men have concerning the difference that exists between the external world, and their own mind, may not have first given rise to the expression. If all that is meant by the word spirit be this, that it is a *something* distinct from our body, he accedes to the accuracy of the distinction, for sound reasoning, founded on experience, has led him to the same conclusion. He grants that the mind is not an object of external sense ; he grants that it does not occupy space ; yet the belief of its existence is forced upon him by the consciousness of what passes within himself ; he knows not what to decide, but thinks it is loss of time to dispute about words. He is convinced that the true manner of studying the human mind is by beginning with the study of the human body ; and he is persuaded that whoever studies it deeply will be convinced that the mind is totally distinct from that part which is evident to the senses. In other respects it is of very little importance to him whether it be called a matter *sui generis*, or an *immaterial substance*. Neither of these terms explain any thing to him.

CHAP-

CHAPTER II.

ON ATTENTION, AND ITS DISEASES.

Definition of the faculty of attention; difference between it and the power of attention; what stimuli excite it. The question whether it is under the influence of volition examined. The great readiness with which we attend to some subjects and objects, when compared with others, accounted for; the effects of education on attention. The morbid alteration of this faculty reduced under three classes, and each of them described and enlarged on.

WHEN any object of external sense, or of thought, occupies the mind in such a degree that a person does not receive a clear perception from any other one, he is said to attend to it. The principle that is excited in his mind by a perception, or thought, is commonly called the *faculty of attention*; a faculty which

which may be justly said to be the parent of all our knowledge.

The experience of every man must lead him to acknowledge that the *power* of attention is different, not only in different individuals, but also in himself at different times. He meets with many who appear to him to exert it in a much stronger degree, and for a much longer period of time, than he himself can do; and he also discovers that some others are much inferior to himself in these particulars. He also observes that he himself cannot attend so well when wearied with fatigue, or oppressed with a full meal, or debilitated by disease, as when these causes do not operate: a proper distinction, then, ought to be made between the *faculty* and the *power* of attention. The faculty is the same, whether in action or not; the power is the degree of excitement produced by the application of mental stimuli.

The stimuli which set it in action, in the first place, are either perceptions of external objects,

objects, or those renewed in the different operations of memory, imagination, and judgment, and when it is disengaged from one set of perceptions and thoughts, and passes to another, this happens either by means of the association of ideas, or by our being accidentally affected by some stronger impression than that with which we were previously engaged. The first of these positions is illustrated by finding that our attention passes easily, as it were, from one part of a chain of argument to another, which we have been accustomed to connect together, or from the recollection of any one past event to a multitude of others associated with it; and the second is elucidated by the facts, that a sudden and strong light, such as a flash of lightning, a loud and sudden noise, and bodily pain, all withdraw the attention from the thoughts it was occupied with the moment before these events occurred.

Are there any other powers which act on attention beside the mental stimuli already mentioned? When we refer to what passes within ourselves, we are inclined to think that attention

tion can be increased by volition. There is no cause to be discovered in the nature either of attention, or volition, why this should not be so ; but the opinion is considered as very unphilosophical by some modern writers, especially by those who deny the free agency of man. It is said that no man wills to be attentive, without some cause excites him to form that resolution. The cause that does so is a motive, and all stronger motives overcome weaker ones ; therefore, when a person wills to be attentive, he only yields to a stronger impression than that which acted on his mind before this act of volition took place ; and therefore we are deceived when we call this a voluntary act.

That the will cannot be excited to act without a cause, requires no great depth of philosophical knowledge to comprehend. The question, however, is not how the will is excited ; the answer to that is of no consequence in the present case : all that we wish to know is whether volition has not a powerful influence on the faculty of attention.

There are, unfortunately, no external phenomena which enable us to judge of what passes in the mind of others on such occasions as are fitted to determine this point; but as consciousness is a principle which makes us acquainted with the exercise of our own faculties, it is reasonable to depend on it for a proof. The conviction of every man who is not fettered by any philosophical hypothesis, is, that he can increase attention by an effort of volition; and when he wishes to excite the attention of any one else, he generally does so by exciting the will of that person. When we form a resolution to act in a certain manner, on any particular occasion, does it not often require the strongest effort of volition to attend to the resolution so as to exclude the impression of motives which, physically speaking, are of a much more powerful kind? A person by previously forming a resolution to submit to certain bodily pain, without uttering a groan, voluntarily directs his attention to some imaginary object, and he feels, or in other words, he is conscious of the voluntary exertion it requires to keep his attention fixed

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on that object under the pains he is suffering. Certain American tribes by fixing their attention on the hatred they owe their enemies, and the injuries which they or their friends have formerly received from them, sustain, without uttering a groan, the most excruciating pains which can be inflicted on the human frame. An Italian criminal, by voluntarily representing to himself the gibbet, and strengthening the representation by frequently calling out *Io ti veddo, Io ti veddo*, sustained all the cruel pains of the torture without confessing his crime.

The principal effect which attention has on the mind, is to render all perceptions and thoughts clearer and more vivid, and consequently to lay the foundation of a sure and faithful recollection, and to render judgment quicker and more correct.

As the mere force or intensity with which we employ attention is, in a great degree, a voluntary act, and as all acts of body and mind are more easily renewed in proportion to the

number of times they are repeated, it is evident how much the attention of parents and instructors of children ought to be directed to this circumstance. It is almost impossible to begin too soon to render children attentive to the objects of their education.

There is a very singular fact attending the exercise of this faculty, which must have struck many people, but which, as far as my reading extends, has not yet been attempted to be explained. It is the great readiness with which we attend to certain subjects and objects rather than to others. The fact is so general that it is deemed unnecessary to adduce instances of it with the sole view of confirming the assertion. Instances must be adduced at all events, to prove the influence of the causes I shall assign for this curious psychological phenomenon.

As far as my own observation goes, it appears to me to depend, in most cases, on one of the two following circumstances :

1st. The

1st. The constitutional proneness which we have to certain passions and emotions, rather than to others.

2dly. The influence of certain desires, passions, and emotions, to which we have not, indeed, any original or constitutional proneness, but which we have acquired from education, from our situation in life, our professions, or customary avocations, and various circumstances which regard our relationship with the world at large.

The common manner of explaining the nature of this secret influence by means of which certain objects seem to arrest our attention more forcibly than others, is by saying that these objects interest us; and in regard to those things to which we cannot direct our attention with steadiness, they are said to have no interest for us. But what do these expressions mean? This interest, what is it?

That

That some men from organization, or constitution, as it is commonly called, are disposed to certain emotions and passions, rather than to others; as, for instance, to the violent emotions of anger, and its modifications; the emotions of fear; the desire of the sex, and its modifications, &c. is a fact which daily experience is sufficient to confirm. Such men have their attention most readily engaged by every object or thought which excites these emotions. A person of an irritable disposition seems to the generality of mankind, from the mere influence which this law of the œconomy has over him, to take delight in seeking for sources of quarrel, controversy, and ill humour. A timorous person seems to create causes of alarm and apprehension from the slightest occasions.

Although the desires, emotions, and passions to which certain individuals are most subject, from the original conformation of their nerves, necessarily give a particular bias to this faculty of attention, especially among uncultivated men, and savages, inasmuch as
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it is most readily engaged by the objects which excite these affections; yet it cannot be denied, that education may do a great deal to modify it. The tendency to any passion may be diminished by many correctives, but these must be very judiciously applied in early infancy, and employed with unremitting care for a great length of time, in order to produce this happy event.

Let us take a cursory view of the influence of the second set of causes, I mean those desires and passions to which we have not any particular proneness from constitution, but which become predominant in the course of our lives from various habits, from our mode of education, professions, avocations, and other relationships which regard our commerce with the world.

This subject is of immense extent, and is highly interesting if viewed in a proper light; for it contains a great store of psychological riches, inasmuch as it explains the effect which various systems of education, and
various

various pursuits and professions, have on the mental faculties, and moral qualities of man.

The whole subject borders so much on ethics, and on moral philosophy, strictly so called, that it cannot consistently with the plan of this work be minutely examined; but as much of its outline may be given as will prove satisfactory in regard to the assertion which has been made.

Education has for its object the improvement either of the body or mind, or both. The actions of the body which are to be improved by education, are chiefly those which consist of certain concatenations, or assemblages of voluntary motions, together with the exercise of the external senses. The improvement of the mind consists in strengthening and rendering its various faculties more perfect, and in acquiring a management over the passions.

Particular instances in which natural gestures and movements of the body have been rendered

rendered quick and vigorous, yet graceful and easy ; in which the organs of external sense have been improved to such a degree as readily to seize the most delicate impressions, and their differences ; and - which, therefore, enable a person to discern and relish whatever is beautiful, as well as sublime, in the external world ; and in addition to which attention, memory, imagination, and judgment have been strengthened by proper objects of study ; and where a great degree of self-command has been acquired in the most trying situations ; such instances are oftener met with in the fictions of romance than in the history of men. Such prodigies, exhibiting the wonderful effects of a happy organization, and of education, however, have occurred, if we can give credit to the testimony of authors. Let no suspicion of vanity arise, if I mention one of my own name as an instance : the admirable CRICHTON, one whom the Muses, the Graces, and Minerva equally patronized. Of all that has been said of him, much, undoubtedly, must be considered as the effects of exaggerated praise, and of that secret spring in the human breast which disposes

disposes men to find pleasure in exciting wonder and surprize in the mind of others ; but making a proper allowance for these motives, there is sufficient evidence of his having so far excelled the generality of mankind in personal accomplishments, as well as in the powers of his mind, and the knowledge he acquired, as to justify me in selecting him as an example, illustrative of a most extraordinary degree of culture. (*a*)

It is seldom, however, that the attention of youth is directed to such a number of objects as are necessary to the formation of men of this description. Of those who, according to the prevailing notion of this country, receive the best education, how few are there who

(*a*) Among the numerous testimonies in favour of the superiority of this man there is one which is not commonly known, though easily ascertained. A Glasgow edition of the Classics were dedicated to him, many of which are still extant ; and as he had no title to such an uncommon mark of distinction from birth, or any other casual honor, it may be reasonably concluded that his wonderful acquisitions were the real causes to which it is to be attributed.

arrive

arrive at that eminence which exhibits the effects of a regular and well-conducted culture both of body and mind. During the early part of life, when all the faculties of the mind ought to be equally exercised, in order to be equally strengthened, does it not but too frequently happen that a boy is kept for many years together to the irksome task of loading his memory with a vocabulary of mere words; and that the active faculties of his soul for the want of proper exercise become inert, and are at last incapable of being exerted on subjects of abstract thought without pain. Of the prodigies of early learning, how few of those who preserve their health, arrive at any great eminence in the paths of science. A boy frequently becomes 'learned at the expence of common-sense, and now and then at that of his judgment. It is, indeed, a melancholy reflexion, that many young people who, previously to the commencement of what is called education, appear to be endowed with the finest minds, and who exhibit a quickness of apprehension and a docility under tuition, which would secure to them an easy conquest in the pursuits of fame, if they were managed with

with sufficient skill, either fall early victims to mental fatigue, or else acquire a great disgust for instruction, merely because the proper stimuli for captivating their attention have not been found out in time. The author dares not enlarge on the subject without going beyond the proper limits of his work.

It is to be observed, that every profession and pursuit of life may be considered as a species of education, which, by creating artificial wants and desires, causes a vast diversity in the proneness which men have for attending to certain objects and subjects of study rather than to others. It would be a curious spectacle to see a representative assembly of men actuated by the various artificial wants which they create to themselves by particular pursuits and branches of study, and that the means of gratifying their desires were to be suddenly granted them, and displayed before them. One would seize a Greek or Latin manuscript as a most inestimable treasure; another a butterfly, or moth; one would run to an antique statue; another to a piece of painted glass; another to a piece of mechanism; a

piece of sculpture, a holy relic, a beautiful shell, a diseased bone, a new drug, a fine dog, or horse, would all have their admirers. One man would desire to mount up on the wings of æther to the milky way; while another would seek to penetrate the granitic crust of the globe, in order to examine its inmost caverns and recesses.

If all that has been said in this chapter be duly considered, it must be granted that the readiness with which we attend to certain subjects, and objects, rather than to others, depends on the two principles already stated. See p. 261.

As a healthy state of the brain and nerves is essentially necessary to the due and regular operations of this faculty, inasmuch as it modifies all impressions received on these organs, it must be evident that it may be greatly altered, or even totally suspended by various diseases of these parts.

Attention can hardly be said to be ever morbidly increased; for although in many instances

stances this faculty is involuntarily engaged for a much longer period of time than is usual, and in a degree which often proves hurtful, yet it cannot be called a disease of that faculty. The attention may be preternaturally arrested, for instance, by a diseased perception, so that the person cannot attend to any thing else ; as is the case in various kinds of hypochondriasis, and melancholy ; but the reason why external impressions do not, in such cases, produce their full mental effect, is not because attention is morbidly increased, but because it is arrested by the preternatural vividness of the diseased perception. Were it a fault of the faculty itself, the energy with which it acted would be equally great to whatever object it was directed, but this is not the case ; which proves that it is a perception only which is diseased.

The morbid alterations to which attention is subject, may all be reduced under the three following heads :

1st. The incapacity of attending with a necessary degree of constancy to any one object.

2dly.

2dly. A total suspension of its effects on the brain.

The incapacity of attending with a necessary degree of constancy to any one object, almost always arises from an unnatural or morbid sensibility of the nerves, by which means this faculty is incessantly withdrawn from one impression to another. It may be either born with a person, or it may be the effect of accidental diseases.

When born with a person it becomes evident at a very early period of life, and has a very bad effect, inasmuch as it renders him incapable of attending with constancy to any one object of education. But it seldom is in so great a degree as totally to impede all instruction; and what is very fortunate, it is generally diminished with age. How it is to be corrected, will be spoken of hereafter in the curative part of the work.

The incapacity of attending with a necessary degree of constancy to any one object, which arises casually, like other diseases, accom-
panies

panies every nervous disorder, in which the sensibility of the nerves is greatly increased, especially in hysteria. Stomachic complaints, chlorosis and hydrophobia also, induce it. In this disease of attention, if it can with propriety be called so, every impression seems to agitate the person, and gives him or her an unnatural degree of mental restlessness. People walking up and down the room, a slight noise in the same, the moving a table, the shutting a door suddenly, a slight excess of heat or of cold, too much light, or too little light, all destroy constant attention in such patients, inasmuch as it is easily excited by every impression. The barking of dogs, an ill-tuned organ, or the scolding of women, are sufficient to distract patients of this description to such a degree, as almost approaches to the nature of delirium. It gives them vertigo, and headach, and often excites such a degree of anger as borders on insanity. When people are affected in this manner, which they very frequently are, they have a particular name for the state of their nerves, which is expressive enough of their feelings. They say they have the *fidgets*.

Should

Should this state of the nerves continue for a great length of time, or often recur, a habit of inattention is the consequence, which is afterwards with difficulty removed. In some cases it increases to such a degree, owing to the violence and obstinacy of the bodily causes, those for instance which spring from the worst kinds of hysteria, and epilepsy, as often lays the foundation for permanent delirium.

The second diseased state of attention was said to be a morbid diminution of its power or energy. This may arise from a great multiplicity of causes, some of which are *corporeal*, and others *mental*.

The *corporeal* causes appear to be capable of being reduced under two heads, or classes.

1st. Causes of debility that operate by exhausting the principle of irritability, and consequently diminish the secretion of the sentient principle, and which of course weaken both external, and sensorial impressions in

force and clearness, and which therefore naturally shorten their duration in the brain.

2dly. Organic diseases of the brain, impeding, to a certain extent, the transmission of impressions.

In both of these cases attention is not sufficiently excited.

The first class of causes is very numerous fevers of all kinds, especially the varieties of typhus; chronic weakness, arising from stomachic complaints, and other diseases of the abdominal viscera. It is a curious circumstance, that the chronic weakness which accompanies scrophula, and rickets, have no influence in diminishing the energy of any of the mental faculties; but chronic weakness, arising from poor diet, bad air, and confinement in warm apartments, circumstances to which the inhabitants of large cities, especially the female ones, are peculiarly exposed; irregularities in diet, excessive evacuations, and the abuse of corporeal desires, are all causes which weaken attention, and consequently debilitate the whole faculties of the mind.

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The second class of corporeal causes are either tumors, which are either gradually formed within, or on the brain, or else they are organic derangements of a more secret and hidden nature, such as arise in consequence of repeated attacks of epilepsy, apoplexy, convulsions, and blows on the head, &c.

The *mental* causes which weaken this faculty are also of two kinds,

1st. Debility, arising from neglecting to exercise the faculty sufficiently, and

2dly. The over-exercise, or abuse of its powers.

The first of these is a direct cause of habitual inattention; the second is an indirect cause of a species of diminished attention, which is for the most part of a transitory nature.

That neglecting to exercise attention is the certain means of inducing a diminished energy

of that faculty, hardly requires any illustration, since innumerable instances are constantly occurring which cannot altogether escape the notice of the most superficial observer.

Among the lower class of people, attention is, generally, sufficiently excited by their numerous wants, the pressure of which, by exciting acute desires, keeps the faculty alive; and hence the natural shrewdness and cunning which many of them exhibit in matters which regard their own interest. But among the more affluent and independent part of mankind, the exercise of attention is commonly dependant on artificial wants, and on those who are entrusted with their education. The influence which the first of these has on the mind shall be investigated in the inquiry into the origin of the passions; with regard to the second, a great number of observations naturally present themselves to every person of reflection who is accustomed to think for himself.

It

It unfortunately happens that the mental treatment of youth, not only at schools and academies, but also at home, is generally the same for all boys. That of girls is subject to a similar fault. The peculiar *ideosyncrasies*, or dispositions of each individual, are seldom sufficiently attended to ; and hence it frequently happens that many of our youth, although endowed with excellent natural talents, remain dunces during the early part of their lives. If they improve afterwards, it is owing to self-tuition, or accidental circumstances having fortunately thrown such objects of science in their way as are fitted to awaken new desires, and kindle the flame of curiosity in their mind. That some boys must be forced to learn by menaces, and fear, and others by intreaty, and kindness, is so common an observation, as to be known by every pedagogue. But although this be the case, the practical rule, it is not always judiciously applied. There is another observation, however, more important than this, that is not generally known, or at least, its force is not acknowledged ; it is this : that many boys require very
different

different objects of study than what others do, in order to have their attention sufficiently roused, and their minds put into due exercise. Every public teacher must have observed that there are many to whom the dryness and difficulties of the Latin and Greek grammars are so disgusting that neither the terrors of the rod, nor the indulgence of kind intreaty can cause them to give their attention to them. If a boy of this disposition be found to be by no means deficient in natural understanding, why should many good years be lost in a fruitless attempt, which must evidently become irksome to the preceptor, and prejudicial to the young person? Would a wise physician insist on it that one kind of diet was that which was most suitable to every constitution? If he found a few individuals who evidently could not digest it, would he not endeavour to find out what things were best adapted to their peculiar idiosyncrasies? It will be found, in general, that the boys spoken of will easily apply to some other branches of study; and if that is the case, the natural bent of mind ought not to be forcibly thwarted, or left neglected.

It

It ought to be recollected that it is a matter of great indifference what it is which a boy first learns, provided it is some useful object, and is of such a kind as to give due exercise to his intellectual faculties. If he once gains a habit of attention, it will afterwards be easily directed to other things of more consequence.

Another circumstance of great importance is this, that as the power of attention is as different in different boys, as their bodily force, so their mental diet, if the expression be permitted, must also be varied accordingly. To some, all kinds of study ought to be rendered easy for the first years of their lives, while to others a certain number of difficulties are absolutely necessary in order to excite a proper degree of attention. Boys endowed with what is commonly called strong minds, require hard and laborious study in comparison with others, if it is meant that they should maintain the superiority for which nature seems to have intended them.—Let not this digression, which certainly belongs to the art of preventing mental weakness and disease, be considered

considered as totally foreign to the physiology. It accounts for the ignorance and inattention of a number of men, who, if they had been judiciously treated in their youth, might have become ornaments to their family, and useful members of society, but who having acquired an early disgust for study, have fallen a prey to false desires and wants, to the great prejudice of their health and fortune.

It has been remarked that debility and torpor of body are causes which weaken attention, inasmuch as the nerves of such people do not convey the impressions they receive with a due degree of force and clearness. The passions and affections of people of this description are naturally weak, and hence they are often of a retired and unsocial disposition, having few friendships, or attachments of any kind, and these seldom of a lasting, or durable nature. But when once the habit of commanding attention is so far weakened as to render a person almost insensible to external objects, or to the impressions which awaken the social feelings, he may then be said to be
predisposed

predisposed to a very bad kind of mental derangement; for if any strong passion be accidentally excited in such a case, how is the attention to be directed to ordinary matters?

I lately attended a very remarkable variety of insanity of this kind, along with my friend Dr. PITCAIRN, to whom it appeared equally uncommon as to myself, although his extensive practice yields him frequent opportunities of seeing the insane.

The patient was a young gentleman, of large fortune, and who until the age of twenty-one had enjoyed a tolerably uniform state of good health. He was of a very delicate and slender frame of body, and of a gentle and calm, but rather unsocial disposition. He bore evident marks of great debility; his hands and feet were generally cold, his veins were small, and although seldom distended with blood, yet they shone through the skin. His countenance was pale, and expressive of great languor, his hair dark brown, and his eyes blue.

When

When I first saw him, the mental derangement under which he laboured, appeared chiefly to consist in a most uncommon degree of absence of mind. He seemed lost to every thing around him, and would willingly sit for near a whole day without moving ; yet, with all this, he was not like a melancholy patient ; for if his countenance was attentively observed, it was easy to discover that a multiplicity of thoughts were constantly succeeding each other in his mind, many of which were gay and cheerful. He would laugh heartily, at times, and it was evident from the character of his laughter, that it was not of that unmeaning nature which we often see in idiotism, but such as any one might happen to fall into who had ludicrous thoughts, and was not under the restraint of society. In a moment afterwards the whole expression of his countenance changed, and he would sink into a deep reverie. In the course of his disorder he became so remarkably inattentive, that even when pressed by some want which he wished to express, he would, after he had

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got half way through the sentence, suddenly stop, as if he had forgotten what he had to say.

When his attention was roused, and he was engaged to speak, he always expressed himself in good language, and with much propriety; if a question was proposed to him which required the exercise of judgment, and he could be made to attend to it, he judged correctly. A total disregard for those whom he had formerly most loved, became daily stronger, and at last he shewed evident marks of dissatisfaction when visited by his near relations; yet, unlike melancholy patients, who generally exhibit a similar antipathy, this conduct did not seem in him to arise from an opinion, either that they had done him an injury, or intended one to him. He would, at times, mutter to himself expressions of anger at their being present; but suddenly, as if aware of the impropriety of his behaviour, he would as quickly change the expression of his countenance, and seem anxious that they should not hear what he said. In the later periods of his illness, however, he was not quite so guarded,

guarded, and would, at times, behave rudely, and then he could not be conciliated by kindness.

When he was placed in such situations as required the exercise of attention, in order to preserve himself from danger he commonly exerted himself until he became familiarized with it, and then he gradually grew less attentive. It was with difficulty he could be made to take any exercise. I prevailed on him, however, for a considerable time to drive his curricule, and accompanied him in it to watch his mind. For a few of the first days he was all attention, but the irksomeness of the exertion made him soon tire, and before he had driven half a mile from home, he returned, although no arguments were spared to induce him to go on. He drove steadily, and when he was about to pass a carriage, took pains to avoid it; but when at last he became familiarized with this exercise, he would often relapse into thought, and allow the reins to hang loose in his hands. He then began to drive unsteadily, sometimes lashing the horses with
all

all his force, and then suddenly checking them until they stood still ; sometimes driving very quick, and sometimes just as slow. His conduct, in this respect, never appeared to be regulated by any wish relative to the nature of the exercise he was taking, but appeared to me to proceed solely from the natural concatenation which habit institutes between the quickness of bodily action, and the quickness of thought. His ideas, I have already said, were for ever varying. When any one crossed his mind, which excited anger, the horses suffered for it ; but the spirit they exhibited at such an unusual and unkind treatment, made him soon desist, and re-excited his attention to his own personal safety ; as soon as they were quieted, he would relapse into thought ; if they were melancholy ones, the horses were allowed to walk slow, if they were gay and cheerful, they were gently encouraged to go fast.

This gentleman generally passed a good night, and he was fond of indulging himself by laying long in bed. His disease began with a slight state of phrenzy, when abroad
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on his travels, and was excited, according to the opinion of his relations, and the servants who accompanied him, by the injudicious conduct of a travelling tutor, whose character, according to the reports spread of him, was more suited for the severities of a monkish life, than the companion of a man of fashion. They had various quarrels; and after the last one, which occasioned their separation, the unfortunate gentleman, whose case I have given, was observed to be very strange in his conduct. Other causes of mental disquietude were represented as having joined themselves to those mentioned; and to the combined influence of the whole the first attack of delirium was ascribed.

It was observed, that attention might suffer a temporary alteration from its healthy state by being too long exercised. This generally consists in a great diminution of its powers, which remains longer, or shorter, according to circumstances. The following case, with which this chapter shall be concluded, is a very remarkable instance of the kind. It is
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that of a Mr. SPALDING, a gentleman well known as an eminent literary character in Germany, and a man much respected by those who know him. The case is drawn up by himself, and was sent to the celebrated Mr. SULZER, and by him presented to the editors of the Psychological Magazine.

“ I was this morning engaged with a great
 “ number of people, who followed each other
 “ quickly, and to each of whom I was obliged
 “ to give my attention. I was also under the
 “ necessity of writing much, but the subjects
 “ which were various, and of a trivial and
 “ uninteresting nature, had no connection the
 “ one with the other; my attention, there-
 “ fore, was constantly kept on the stretch, and
 “ was continually shifting from one subject
 “ to another. At last it became necessary that I
 “ should write a receipt for some money I had
 “ received on account of the poor. I seated
 “ myself, and wrote the two first words, but
 “ in a moment found that I was incapable of
 “ proceeding, for I could not recollect the
 “ words which belonged to the ideas that were
 “ present

“ present in my mind. I strained my atten-
 “ tion as much as possible, and tried to write
 “ one letter slowly after the other, always hav-
 “ ing an eye to the preceding one, in order to
 “ observe whether they had the usual relation-
 “ ship to each other; but I remarked, and
 “ said to myself at the time that the characters
 “ I was writing were not those which I wish-
 “ ed to write, and yet I could not discover
 “ where the fault lay. I therefore desisted,
 “ and partly by broken words, and syllables,
 “ and partly by gesture, I made the person
 “ who waited for the receipt understand he
 “ should leave me. For about half an hour
 “ there reigned a kind of tumultuary disorder
 “ in my senses, in which I was incapable of
 “ remarking any thing very particular, except
 “ that one series of ideas forced themselves
 “ involuntarily on my mind. The trifling
 “ nature of these thoughts I was perfectly
 “ aware of, and was also conscious that I made
 “ several efforts to get rid of them, and sup-
 “ ply their place by better ones, which lay
 “ at the bottom of my soul. I endeavoured,
 “ as much as lay in my power, considering
 “ the

“ the great crowd of confused images which
 “ presented themselves to my mind, to recall
 “ my principles of religion, of conscience,
 “ and of future expectation ; these I found
 “ equally correct, and fixed as before. There
 “ was no deception in my external senses, for I
 “ saw, and knew every thing around me ; but I
 “ could not free myself from the strange ideas
 “ which existed in my head. I endeavoured
 “ to speak, in order to discover whether I was
 “ capable of saying any thing that was con-
 “ nected, but although I made the greatest
 “ efforts of attention, and proceeded with the
 “ utmost caution, I perceived that I uni-
 “ formly spoke other words than those I in-
 “ tended. My soul was at present as little
 “ master of the organs of speech, as it had
 “ been before of my hand in writing. Thank
 “ God, this state did not continue very long,
 “ for, in about half an hour, my head began
 “ to grow clearer, the strange and tiresome
 “ ideas became less vivid and turbulent, and
 “ I could command my own thoughts with
 “ less interruption.

“ I now wished to ring for my servant, and
 “ desire him to inform my wife to come to
 “ me ; but I found it still necessary to wait a
 “ little longer, to exercise myself in the right
 “ pronunciation of the few words I had to say ;
 “ and the first half hour’s conversation I had
 “ with her was, on my part, preserved with a
 “ slow and anxious circumspection, until at
 “ last I gradually found myself as clear and
 “ serene as in the beginning of the day. All
 “ that now remained was a slight headach. I
 “ recollected the receipt I had begun to write,
 “ and in which I knew I had blundered ; and
 “ upon examining it I observed, to my great
 “ astonishment, that instead of the words *fifty*
 “ *dollars, being one half year’s rate*, which I
 “ ought to have written, the words were *fifty*
 “ *dollars, through the salvation of Bra—* with
 “ a break after it, for the word *Bra* was at
 “ the end of a line. I cannot recollect any
 “ perception, or business, which I had to
 “ transact, that could by means of an obscure
 “ influence have produced this phenomenon.”

CHAPTER III.

ON MENTAL PERCEPTION, AND ITS DISEASES.

Definition of the faculty ; equivalent terms. Dr. REID'S speculations examined and criticised. ARISTOTLE'S opinion the basis of all succeeding ones which are founded on observation. The reason why two people have not always the same perception from the same object. How this faculty modifies impressions by its active power, so as to convert them into objects of thought. Various circumstances necessary for the full production of this effect. What causes weaken impressions. The meaning of the word idea explained. Difference between observation and reflection ; some people disposed to the one more than to the other ; the effects which this produces on their mental character. The faculty is subject to two idiopathic diseases, and various symptomatic ones. The diseases described and examined.

WHEN an object acts on any of the nerves which supply the organs of external sense, and our attention is not strongly engaged at the

time by any other object, we immediately become conscious of the presence of the external body, and we obtain a mental perception, or representation of it.

We become conscious that something which was not present to the mind the moment before, is now present to it, and we have an immediate and firm conviction that the body of which we have this intuition is without us.

The faculty which the mind is endowed with, of thus receiving the representation of an external object, is commonly called the faculty of mental perception, which, although a bad term, inasmuch as it is borrowed from one of the external senses, I shall not change. Other terms have been preferred to it by different writers, such as apprehension, and conception; the Germans call it *vorstellungskraft*, which, literally translated, signifies the representative faculty, and is, doubtless, far from being a bad expression; but it is subject to the same objection as perception, inasmuch as it is a term of vision. As all words, however,
that

that are intended to denote changes which take place in the mind, must be borrowed from the language of physics, it is of very little consequence which of them is adopted, provided an author explains what he understands by them. In this chapter, the expressions mental perception, mental representation, intuition of an external object, and apprehension of one, are all employed in a *synonymous* sense, and mean the effect which an external object produces on our mind, so that we become conscious of its existence. If one of them seems to be preferred at one time to the rest, it is not because a different idea is intended to be conveyed, but solely for the purpose of avoiding the repetition of the same word.

It must be sufficiently obvious from what has been already said, that the mind does not perceive external bodies immediately, but mediately, through the medium of the nerves and brain. This reflection naturally demands that some notice should be taken of the speculations of Dr. REID, on this subject, especially as his discoveries, as they are called, militate against this

this idea, and have of late been praised and adopted by my very learned preceptor, professor STEWART, in his *Elements of the Philosophy of the Human Mind*.

Dr. REID does not offer any hypothesis of his own concerning the nature of mental perception, but he attempts to pull down all the opinions of others on that subject, especially those of the peripatetics, and of LOCKE and HUME.

It appears to me that the opinions of ARISTOTLE are to be considered as the basis of all the theories of those psychologists, who, like LOCKE and HUME, have taken facts and observations for their guide. But the misapplication which was afterwards made of the terms he employed, and the fanciful notions entertained concerning them by schoolmen, have given occasion to much misrepresentation of his doctrine. The doctrine of that great and wonderful genius is a fair logical deduction, drawn from a due consideration of the qualities of external bodies, and the nature of the external senses, and of mind. He asserts that

that “ as our senses cannot receive external
“ material objects themselves, they receive
“ their species ;” that is, as he himself explains, they receive their images, or forms, without the matter, as wax receives the seal without any of the gold of which it is made. To these he afterwards gives various denominations, according as they are objects of sensation, or refined into objects of memory, imagination, and pure intellect ; or, as agreeable to his notion, they become objects of pure science. To distinguish all which modifications of the forms of external bodies he employed the names *sensible species*, *phantasms*, and *intelligible species*.

This doctrine has two parts, the first of which relates to the manner in which external objects act on the mind ; the other to certain changes which that primary affection of the mind was supposed to undergo, in consequence of the operation of some of the mental faculties. It is the first part of the doctrine only which concerns us ; the second is a fanciful conjecture, unsupported by any facts, and
hence

hence the terms, *phantasms*, and *intelligible species*, ought not to be employed. Dr. REID, however, argues against the whole doctrine. He supposes that external objects affect the mind not through any medium such as the nerves and brain, but that they act immediately on it. He is too cautious to explain how they do this. It is a kind of conclusion that arises in his mind, more from having detected the fallacies of the schoolmen, than from any observations he seems to have made on himself, or any reasoning founded on the phenomena, and well known qualities of the external senses. The followers of ARISTOTLE supposed that the species, images, or forms, were things which issued from the external objects, and entered the mind through the senses ; but in doing this they add an hypothesis of their own invention to the plain facts which ARISTOTLE told. Dr. REID treats this fanciful conjecture with the ridicule it deserves, but the arguments he employs against it do not militate against the opinion of ARISTOTLE, that external bodies must first act in a physical manner, on the external senses, before they affect the mind, and that the common sense, or intellect,

tellect, receives these impressions. Dr. REID, although he affects to have divested the subject of mental perception of all theoretical expressions, has in fact indulged himself in an hypothesis, which I will venture to assert is more fanciful than that of ARISTOTLE's. He supposes that the impressions, which according to his opinion, do not bear any resemblance to the bodies themselves, are only exciting causes of perception; the mind perceives the bodies themselves. Lest it be imagined that I misrepresent Dr. REID's hypothesis, I shall give it in the words of his friend and admirer, professor STEWART. In page 92 of his *Philosophy of the Human Mind*, after having given a full account of the Doctor's speculations, he says, " To what then, it may be
" asked, does this statement amount? merely
" to this: that the mind is so formed, that
" certain impressions, produced on our organs
" of sense by external objects, are followed
" by correspondent sensations, (which have no
" more resemblance to the qualities of matter,
" than the words of a language have to the
" things they denote,) are followed by a per-
" ception

“ ception of the existence and qualities of the
“ bodies by which the impressions are made ;
“ that all the steps of this process are equally
“ incomprehensible ; and that, for any thing
“ that we can prove to the contrary, the con-
“ nection between the sensation, and the per-
“ ception, as well as that between the impres-
“ sion, and the sensation, may be both arbi-
“ trary ; that it is, therefore, by no means
“ impossible, *that our sensations may be merely*
“ *the occasions on which the correspondent per-*
“ *ceptions are excited*, and that, at any rate, the
“ consideration of these sensations, which are
“ attributes of mind, can throw no light on
“ the manner in which we acquire our know-
“ ledge of the existence and qualities of body.
“ From this view of the subject, it follows,
“ *that it is external objects themselves*, and not
“ any species, or images of these objects, that
“ the mind perceives ; and that, although by
“ the constitution of our nature, certain sen-
“ sations are rendered the constant antece-
“ dents of our perceptions, yet it is just as
“ difficult to explain how our perceptions are
“ obtained by their means, as it would be,
“ upon

“ upon the supposition, that the mind were
“ all at once inspired with them, without any
“ concomitant sensations whatever.”

Independently of the hypotheses already alluded to and contained in the citation above, it is further to be remarked, that Dr. REID embraces the commonly received notion, that there is a certain act of the mind which intervenes between the impression on the nerves, and the perception, which act, like many other writers on metaphysics, he chooses to call sensation. In this work it has been attempted to be proved that there is no act of the mind between the impression which external bodies make on the nerves, and mental perception, except the sensorial impression be considered as such; which however, is nothing else than a mere continuation of the physical impression, made by the external body on the nerves.

The word sensation ought either to be made equivalent with nervous impression, or consciousness; and whenever it is employed by any author, it ought to be accurately stated which of the two it is intended to express.

In

In addition to what has been said in the chapter on sensation, it may be observed, that no two persons, perhaps, have exactly similar and corresponding perceptions of any external object whatever. Some cannot distinguish green from blue, others cannot distinguish a sub-acid taste from a saltish one; some people have no perception of certain colours; hardly three people out of ten will agree perfectly about the exact relation which any one shade of colour has to others of the same kind; circumstances which cannot be well explained in any other way than by supposing that the nerves of different men are differently modified, and that owing to this difference in structure, all external impressions must also be different in such men. If this conclusion be not admitted, the fact must be explained by supposing the mind to be differently *organized* in different men.

A mental representation is that effect which the figure of impression makes on the mind.

As consciousness is to the mind what sensibility is to the body; no representation can take place

place of which we are not conscious, provided our attention be not strongly engaged at the time.

This faculty by which we receive representations, may be said to be the basis of all the other mental faculties, for it will be found afterwards that memory, imagination, and judgment, are only the renewal, the combination, and comparing of representations, or intuitions, which have been already received.

As the knowledge we have of any external object is generally acquired through the medium of more than one of the organs of external sense, and as our knowledge of the body is a representation of all the individual impressions it has made on these organs, united as it were, into one individual thought, or idea, it is evident that this faculty of the mind is constituted of an active power which changes the nervous impressions, and assimilates them to the nature of mind.

In order that this faculty shall receive clear impressions *ab externo*, and produce its full mental effects on these, so as to give them the nature

nature and characters of thought, many circumstances are necessary.

It has been proved that the nerves of the external senses alone convey distinct impressions to the brain, and the physical and efficient cause of this have also been attempted to be demonstrated. Admitting the mere fact, it is to be observed, that all impressions calculated to produce a representation in the mind, must not only be made with a certain degree of mechanical strength, in order to reach the sensorium; but the sensorial impression must also be of a certain degree of force, in order to affect the mind.

There are two classes of causes which weaken impressions so much as to render them unfit for affecting the mind. The first one is entirely mechanical, the second psychological. The mechanical causes occur when the arrangement at the extremity of a nerve has not been sufficiently altered by the body applied; the figure of impression, in this case, either does not reach the brain, or if it does so, the sensorial impression that is produced by it is so weak as not to be sufficient for the purpose
of

of exciting a representation in the mind. It becomes so much the more necessary that impressions on the extremity of the nerves should be made with a certain degree of force, in order to excite a representation, because nature herself seems to have been under the necessity of placing a number of obstacles in the way. The extremities of the nerves of the organs of touch are all covered by the cuticle, and a very fine membrane, the *rete mucosum*. The extremities of the nerves of the nose are covered by a delicate membrane, and a coat of mucus; those of the ear are defended by a membrane, a fluid, and a coat of a thick, secreted matter; the retina of the eye has many membranes and humours interposed between it and the rays of light. In short, the extremities of the nerves are no where exposed to the immediate impression of external bodies. Had that been the case, it is evident that from their very delicate texture they must have been frequently subjected to much violence from the force with which many bodies are often applied to them.

The psychological cause is the faculty of attention: by its active powers all impressions
of

of external bodies are either rendered vivid, or are impeded in their operation on the mind upon principles, which we perhaps shall never be able fully to comprehend. If on the one hand our attention be wholly directed to the objects which strike our senses, the nervous impression not only seems to be more acutely felt, but the representation in the mind seems also to be so much the more complete and accurate. On the other hand, if it be already engaged by any object of thought, the impressions of external bodies fail to produce their due mental effect. A person who is thus occupied, may stare his nearest friend in the face, and pass him, as if he was unknown to him. If, in perusing a work of science, or genius, our mind is led astray to a distant train of abstract thought, we may continue to read, and yet not understand one word of the book. The words are seen, they make a full impression on the eye, and that is conveyed to the brain, but it does not seem to affect the mind. That it is conveyed to the brain is evident from this, that if the person was reading aloud, he shall continue to pronounce the words,

words, and yet, if suddenly stopt, he does not recollect one word of what he has seen. Many external bodies are made up of parts, which are extremely different from each other in form, size, colour, density, and a variety of other physical properties, which are calculated to affect our senses. Each of these parts may be considered as a distinct object of representation. The more completely, then, that the several parts and physical properties of any object are represented in the mind, the more perfect will the general representation of that object be.

It is justly and acutely observed by my friend, Dr. MARCUS HERZ, in his celebrated work on Vertigo, that a certain portion of time is required before an external body is duly represented in the mind. If a number of objects pass quickly before our eyes, or a number of sounds rapidly succeed each other, we have but an imperfect representation of them; they have not staid long enough in the mind to be fully felt as it were.

As the faculty of mental perception is an active one, and operates on the impressions received by the senses, a certain portion of time, however short it may be supposed to be, is always necessary for its due accomplishment. If external impressions succeed each other too rapidly, this kind of mental assimilation cannot take place, and a crude and defective idea is the consequence; hence a person who sees an unknown animal, or a complex piece of architecture, only for a short time, has a very imperfect knowledge of them; the more remarkable parts only are attended to. A person who is capable of painting from memory, will make a more exact resemblance of any thing which has a number of parts, after he has seen it several times, than he could possibly have done had he only seen it once or twice; and hence we see the reason why people have a more accurate recollection of subjects connected with their favorite pursuits, or studies, than with those which they have not been accustomed to contemplate.

It

It is evident, then, from what has been already said, that our knowledge of complex bodies will be more or less complete, in proportion to the number of their parts and qualities represented in our mind. Of those which are calculated to affect several of our external senses, our knowledge must be slowly gained, since a certain portion of time elapses in attentively examining all the impressions which arise from them.

Our knowledge of bodies is often counteracted by causes which it is not in our power to remove. If the organs of external sense are weak, or faulty, a number of parts may not only escape observation, but even if they do engage attention, they are not accurately represented. Distance may operate in the same way, for it conceals from us a number of the minuter parts of the body.

There is a term borrowed from the Greeks, employed by DESCARTES, LOCKE, HUME, BERKELEY, and most of our best metaphysicians, which is nearly of an equivalent signification

fication with the expression, mental representation ; the word alluded to is *idea*. Dr. REID rejects this expression on account of the absurd hypothesis already mentioned, with which it was connected, and in its place he substitutes the term *notion*. These terms are usefully employed in a sense nearly equivalent to that of mental representation, in cases in which it would appear affected to make use of this last expression. It is more natural to say that a person has an idea, or notion of virtue, courage, honour, charity, benevolence, and gratitude, than to say that he has a representation, or perception of them. Although these words are supposed to express certain abstract qualities of mind, rather than any thing which is corporeal, yet a little reflection will soon convince us that our knowledge of their existence arises from external and visible objects. According to the views of the society we live in, and their particular doctrines and forms of religion, certain actions are denominated vices, while others, from promoting the ends of society, and the purposes of religion, are called virtues. In our infancy, and as we grow up
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in life, we are taught to discriminate the one set of actions from the other, by hearing them receive the appellations mentioned. The word *virtuous*, then, is applied to conduct, or certain actions. In like manner we are taught to apply the word *courageous* to a man who fights well in battle; he who relieves the poor is said to be *charitable*; and when our words and actions are expressive of kindness to those from whom we have received a benefit, we are told we are *grateful*. Our notions, then, of these things are so far derived *ab externo*. We have a consciousness, or knowledge, however, that our own voluntary actions are excited by certain thoughts, which we call motives or principles; and as we naturally imagine that the actions of every other man arise in a similar manner, we endeavour to characterize the principles of human action by different names, and thus we call the motives which prompt a man to do virtuous actions, *virtue*; and courageous actions, *courage*, &c. Although our knowledge of these principles is originally derived from the external world, yet as they themselves are not representations

representations of any individual external object, it is proper to have a different term to express them. It is, moreover, to be observed, that the word representation cannot be well applied to the knowledge we have of our own thoughts, and the operations of our mind, since it is not derived from any impression on our external senses, but from a kind of mental feeling we call consciousness. In all such cases, therefore, the old word idea, or intuition, is a much better term.

Dr. REID remarks, with much justice and ingenuity, that when our attention is directed to external objects it is called *observation*, and when it is directed to our thoughts alone, it is called *reflection*. The distinction between these two is obvious, and hence the utility of these expressions.

Although education is the circumstance which, generally, has a great and evident influence in rendering a person an observer, or a man of reflection; yet we must also search in the organization of the body, and the natural condition

condition of the mind, for the difference of character. If a number of children be attentively observed at the time when they first begin to acquire a tolerable good management of their external senses, we shall discover a vast difference among them in this respect. Some are all hands, and ears, and eyes; others are naturally serious and thoughtful; and others dull and heavy, lumpish in body, and torpid in mind. In the first class the sensibility of nerves, especially those which supply the organs of external sense, is great; every object acts powerfully on them, excites them, and keeps their attention constantly employed with the external world. When this sensibility of nerves is excessive, and disproportionate to the energy of the mind, a physical restlessness occurs which disturbs all instruction; their attention is constantly withdrawn to external objects; and when they grow up in life they generally run into every species of thoughtless excess. But when it is only acute, and accompanied with an active mind, it lays the foundation for the most splendid and shining character. All depends, then, upon the
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the mode in which attention is directed and improved ; or in other words, on the education that is given them, and the conduct they are made to observe.

The serious and thoughtful boy has less sensibility in the nerves of his organs of external sense, than force of mind ; his attention, therefore, is more easily excited by his own thoughts than by external objects. He is silent, absent, and often solitary ; and if this state be not corrected by the most judicious management, he becomes unfit for every active commerce with the world. He may become a good and learned scholar, astronomer, mathematician, or metaphysician, and may easily excel in every abstract science in which the powers of the mind alone are principally required. But he makes a bad observer, and consequently always appears to mankind at large, much inferior in talents to the generality of other people. He is inattentive to the common circumstances of common conversation, and unacquainted with the topics of it. He is a perfect book-worm, for his natural desires lead him

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on to knowledge, and his averfions make him renounce general fociety. Between thefe two extremes there are various fhades of mental character, arifing from a variety of conftitution ; difpofing fome, on the one hand, to exercifes of the mind, and others to exercifes of the fenfes. If education, and the accidental circumftances of life do not correct thefe biaffes when very ftrong, terrible effects are apt to follow in the courfe of time. The mind of the one is liable to become torpid for want of due exercife, the principal occupation of the perfon being the employment of his external fenfes ; the mind of the other is too much exalted at the expence of the external fenfes, and therefore the foundation is laid for a predifpofition to fingular illufions, the nature of which will afterwards be explained when the deliria to which men of genius are fubject, are treated of.

The representative faculty of the mind may be variously altered from its natural state ; and of these morbid alterations two may be said to be idiopathic, or specific, all the rest are sympathetic,

sympathetic, and arise from diseases of the external senses.

The first specific disorder to which this faculty is exposed, is fatuity, or idiotism, in which it appears that no accurate representation of any external object, and no abstract thought, or reflection, ever occurs. The phenomena by which this complaint is distinguished are very striking; a vague, unsteady, wandering eye, which is seldom fixed for any length of time upon any one object; a stupid expression of countenance, in which no sign of intelligence is portrayed; a gaping mouth, from which the saliva flows constantly; a perpetual rolling and tossing of the head; no memory, no language, no reason. The idiot has all the animal instincts, and some of the passions. Of the last, joy, fear, and danger, are those with which he is most frequently affected, but these are of a very limited kind; his joy is unmeaning mirth; his fear a transient qualm; his anger a momentary fit of violence: the toys of children, and the gratification of hunger and thirst, are his only pleasures;

pleasures ; bodily pain, or fear of bodily pain, the only sources of his anger. It is a common opinion that idiots have not only strong sexual desires, but also great powers to execute them. Whether this notion is well founded or not, I cannot take upon me to decide, having never instituted any experiments whereby it may be ascertained. It is certain that those who are completely fatuitous, seldom exhibit any desire on the approach of the opposite sex.

This disease is either congenital, or accidental ; the first is by far the most frequent ; the number of born idiots exceeding those of the others by a vast proportion. A faulty conformation of the bony parts of the head, and of the brain itself, are generally the causes from which this humiliating disorder proceeds. Of those who are idiots from birth, a number are affected in the course of their lives with palsy, or epilepsy, sometimes with both ; a clear proof of the existence of some organic affection of the brain or nerves. The palsy, sometimes very partial, occupying the face only,

only ; at other times the whole of one side is affected.

There are few instances of born idiots attaining an old age : they seldom live until they are thirty ; and of those who are epileptic or paralytic, the greater number die before they are twenty-five. Fatuity and idiotism may arise accidentally from a variety of causes, which, by mechanically deranging the texture of the brain, destroy all the operations of the mind. It is in this way that idiotism often comes on after repeated attacks of epilepsy, fevers of bad kinds, blows on the head, and also as a consequence of phrenzy.

The next disorder to which this faculty is subject is vertigo, or dizziness. Before the nature of this complaint can be perfectly understood, a number of physiological facts must be taken notice of, the mentioning of which has been purposely delayed until this moment, because it was imagined they would make a more forcible impression on the mind of the reader,

reader, from their natural connection with this curious object of inquiry.

The time required before the representative faculty of the mind obtains a due representation of any external object; or to express one's self in simpler language, the time that is necessary to examine external objects with a due degree of accuracy, is very different in different cases. The circumstances which particularly regulate this, appear to be three in number:

1st. The greater, or fewer number of parts, of which an object of external or internal sense is composed.

2dly. The degree of attention employed during the examination of the object.

3dly. The difference in the natural *receptivity* of mens minds.

1st. Simple bodies, and those which are similar in appearance, such as a series of similar pillars,

pillars, or columns ; a flock of sheep, or deer ; a number of soldiers dressed alike, are all quickly examined. The eye glides easily from the one to the other, and no unpleasant effect arises in the mind in consequence of the rapid succession of representations which occur. But when the objects are different from each other, and new to us, such as a number of foreign flowers, or pictures and statues, before unseen, our attention is arrested by each one, and it seems painful to withdraw our sight from them until the eye shall have reposed, as it were, for a certain time on each. This observation is not peculiar to external objects, for our internal thoughts are subject to the same laws ; those ideas which are simple and familiar to us, glide quickly and easily across the mind without occasioning any strain of attention, or producing any uneasiness in their transit ; but others arrest our attention, as it were, by force, and we cannot dismiss them from our mind without a kind of effort, which is painful. If they are forced upon us in rapid succession, they produce a great deal of
mental

mental disorder which will be immediately described.

2dly. That the time necessary for obtaining a due representation of any object, is regulated, in a great degree, by the attention employed, does not surely require much illustration. No man can have attained the age of reason without having repeatedly made the observation.

3dly. The third circumstance which regulates the time necessarily employed by the mind in obtaining a due representation, or idea of any thing, is what the Germans very properly call *receptivity*.

The word is applied to denote a fact which is hinted at in English, when we say that such a person has a quick apprehension, or comprehension, and that such another person has a slow comprehension, or apprehension. There is a natural difference in the constitution of the mind which fits it for receiving and retaining with more or less facility, the influence of sensorial impressions; just as there is a constitutional difference in the nerves of people, which
causes

causes some to feel all external impressions much more acutely than others. It is to this principle that a great deal of the natural inequality which we observe in the intellectual powers of different children, and men, are to be referred. When the receptivity is great, every external object is quickly apprehended, and the most complex and abstract thoughts seem to be understood as if by intuition. Where the receptivity is weak, external impressions must be often repeated, or long continued, before the representation in the mind is complete; and abstract and complex thoughts must not only be often repeated, but reduced to all their primitive parts, and offered piece-meal, as it were, to the mind, before the person can be made to comprehend them. What we call quickness of mind, and its opposite term, dullness, are qualities, then, of its receptive powers.

There are certain ideas, and modifications of thought which our mind seizes in preference to others. Some men are painters, poets, and arithmeticians, &c. from the natural constitution of their minds, and in early youth always exhibit

exhibit a greater predilection for the peculiar objects of these studies, than for others. A bent of mind to certain branches of study, rather than to others, may be acquired by habit, as well as derived from birth, as hath been fully explained in the preceding chapter ; for the receptive powers are always rendered pliant by renewing the same set of impressions. Although a person should find it painful at first to fix his attention to any particular science, yet by persevering, the aversion gradually wears off ; and after he has made a certain progress in it, he at last finds that every thing which relates to it interests him, and his receptivity for all the thoughts connected with it, is increased to a surprizing degree.

When mental representations and ideas succeed each other slowly, an irksomeness of mind takes place, which the French call *ennui*. The slowness hinted at is necessarily relative to the nature of the ideas. New ideas please much better when they succeed each other with a certain degree of slowness, than when quickly presented to the mind; but when a

VOL. I. Y person

person is confined to the house, and is deprived of society, and has no opportunity of seeing a succession of new objects, and is not under the influence of any desire, or passion, which can give rise to a flow of thoughts, he necessarily falls into this distressing state, from the too slow succession of old or accustomed thoughts. If we have no means of escaping from a dull, ignorant, and prolix companion, whose whole conversation is about common place topics, and whose thoughts have no association with any of our pursuits, or inclinations, we fall into a state of *ennui*. This tormenter of human happiness often occasions a degree of inquietude which is productive of the most alarming and fatal consequences ; for the desire of relief becomes, in some cases, so great as totally to destroy all judgment, and consequently hurries the person on to the most criminal violence against nature. It is in this way that *ennui*, like melancholy, may terminate in suicide. In a lesser degree, it produces a number of well-known, but no less remarkable phenomena ; a restlessness, and sense of weariness, spread themselves over the whole frame ;
the

the person gapes and yawns frequently, his senses become dull, his attention unsettled, and he at last falls asleep; or if he be young and active, the distressing feelings which accompany this state give rise to a powerful desire of relief. I have seen a person in company after suffering impatiently these kind of tortures for a long time, at last totally forgetting where he was, suddenly start from his chair like a frantic person, walk about the room for a minute or two with a quick pace, panting for breath, as if he had not breathed freely for some hours before, until the expressions and astonishment of the people around him awakened him from his delirium, and brought him to a proper sense of the indecorum he had been guilty of.

It is a favorite opinion with HELVETIUS, and many other philosophers, that ennui is one of the most powerful motives in the mind of man which stimulates him to great actions. There can be no doubt of the general truth of this fact, only it is not quite accurately expressed; for it is the desire of relief from pain,

and not the languor from which the actions spring.

When mental representations, and ideas, croud involuntarily, and in too quick succession, they occasion the disease called vertigo, or dizziness. This is the opinion of Dr. MARCUS HERZ, with whom I intirely coincide; he defines vertigo thus: "*It is a state of mental confusion, arising from the too rapid succession of representations.*" P. 176. To this definition the word involuntary ought to be added, because a series of thoughts may pass more rapidly through the mind, than those which occasion vertigo, and yet no such disease follow; as happens often in the case of quick reading, and where we are under the necessity of recollecting, suddenly, a number of past events; and also when we are under the influence of certain passions, such as anger.

The symptoms of the disease are these: external objects appear in a rotatory motion, revolving either horizontally from right to left, or *vice versa*; or perpendicularly from
above

above downward, or from below upwards. It frequently happens at the same time, that the person seems as if his own body was in motion, and that generally in a contrary direction to the apparent motion of the objects. Double vision, and sudden changes of the colour of bodies, are also frequently seen by vertiginous patients. The person staggers, a paleness overspreads the countenance, the pulse becomes small and quick, vision dim and obscure, the muscles which support his body give way, and he falls down. Dr. HERZ enumerates a number of other symptoms, which he reduces under so many heads; but it appears to me that those already mentioned are the only ones which are general and common to all kinds of vertigo. Those which remain to be mentioned arise in particular cases, according to the nature of the causes which produce it, and other morbid affections which accompany it.

It has been said that vertigo consists in an involuntary rapid succession of representations

or

or ideas. The exciting causes are various, and are either external or internal.

The external ones are, 1st. the being placed in such situations that we cannot judge whether we preserve our natural posture or not, as when we are obliged to walk along a narrow board, suspended high over a river, or chasm, and having no safeguard on either side; or when we direct our eyes down a precipice, or from any great height; or, 2dly. when external objects are made to revolve rapidly before our eyes; and, 3dly, they are such disgusting objects as upon being viewed excite nausea.

The manner in which the first class of external causes operate is well imagined, and described by Dr. DARWIN. He thinks with justice, that we preserve our upright posture by a species of judgment. "In learning to walk," he says, "we judge of the distance of the objects which we approach by the eye; and by observing their perpendicularity determine our own." The human body cannot preserve an upright posture without a
constant

constant exertion of the muscles of voluntary motion, as is evident from its falling down, or staggering, when volition is suspended or impeded. If by a false step we are thrown a little out of the perpendicular posture, we immediately observe it by the apparent alteration which occurs in the situation of the bodies around us; and we know we have recovered our former attitude when we discover them to be in an erect posture also, or in the one in which they naturally appear to us while we ourselves are erect. Now if the objects which govern us, therefore, in this matter, be regulated in any manner which we have not been accustomed to, or are so far withdrawn from our sight, that they no longer serve as guides by which we can regulate our postures, we immediately begin to stagger. No person who is blind-folded, or who is in such a situation where the objects around him are in an unusual motion, as on board of ship, can preserve his posture, for as soon as he feels himself begin to stagger, he endeavours, by the exertion of those muscles which support him, to recover his posture; and as this is seldom

dom accomplished at once, and when accomplished is only preserved for a few moments, the vibration of his body increases the apparent motion of the surrounding objects, their representations pass quickly, and in disorder across his mind, and he becomes vertiginous. Many people are seized with vertigo from seeing a large wheel revolved near to them. Their propinquity to the object, and its largeness, are, in some respects, necessary conditions for the production of this effect; for by this means the person is prevented from seeing objects which are at rest. In like manner, many people become vertiginous from seeing a body in confused motion near them; and this explains the secret of that mysterious influence, called animal magnetism. It is well known that many people faint in consequence of being magnetised. The magnetisers withdraw the attention of the persons from the objects around them by means of various and sudden motions of the hand, made almost close to the eyes of the person. These manipulations consist in a number of sudden jerks and rotatory movements of the hand, and also in closing

closing and expanding the fingers quickly before the eyes of the patients; hence they lose the sight of all the objects in the apartment which are at rest, and consequently lose the command of attention to their own thoughts; they therefore become dizzy, in the manner which I have described. I will venture to assert, from what I myself have experienced under the trials of MESMER'S disciples, that if the attention be strongly employed, either upon some distant object which is at rest, or what is much better, with one's own thoughts, such as family concerns, or the remembrance of absent friends, no vertigo, or fainting, hysteria, or convulsions, or any other disease, which the magnetisers choose to call a *crisis*, will ensue.

Vertigo is very frequently accompanied with a loud noise in the ears like that of a torrent falling over a precipice. This symptom is common in the vertigo which arises in consequence of intoxication, and in that which precedes apoplexy. It appears to me that it may always be accounted for in the following manner: when the blood is determined to the
head

head in greater force than usual, the vibrations it communicates to the petrous portion of the temporal bone, are always heard, and when they are thus heard, they constantly recall to our recollection the sound of the rushing of waters. There is another kind of tinnitus aurium, or noise in the ears, which is peculiar to the vertigo of nervous people, and those who are about to faint. It consists of a number of quick concussions, of a metallic sound, and is compared to the ringing of bells. This, I believe, constantly arises from a convulsive motion of the muscles of the *malleus*, by which it is thrown into repeated actions. This conjecture arises from the well known fact, that it often precedes epilepsy, and hysterical paroxysms. It is also often heard by nervous patients when agitated, or affected by cold, indigestion, or such causes as bring on in them slight spasmodic affections. Dr. DARWIN explains this curious circumstance in a different manner, which is consistent with his general doctrine, but which may be said to be a very round-about way of accounting for the phenomenon.

“ During

“ During our waking hours,” he says, (Vol. I. p. 234,) “ there is a perpetual confused
“ found of various bodies, as of the wind in
“ our rooms; the fire ; distant conversations ;
“ mechanical business ; this continued buzz,
“ as we are seldom quite motionless, changes
“ its loudness perpetually, like the found of a
“ bell, which rises and falls as long as it con-
“ tinues, and seems to pulsate on the ear.
“ This any one may experience by turning
“ himself round near a water-fall, or by strik-
“ ing a glass bell, and then moving the direc-
“ tion of its mouth towards the ears, or from
“ them, as long as its vibrations continue.
“ Hence this undulation of indistinct found
“ makes another concomitant circle of irrita-
“ tive ideas, which continues throughout the
“ day.

“ We hear this undulating found when we
“ are perfectly at rest ourselves, from other
“ sonorous bodies besides bells, as from two
“ organ pipes, which are nearly but not quite
“ in unison, when they are sounded together.
“ When a bell is struck, the circular form is
“ changed

“ changed into an elliptical one ; the longest
“ axis of which, as the vibrations continue,
“ move round the periphery of the bell ; and
“ when either axis of this ellipsis is pointed
“ towards our ears, the sound is louder ; and
“ less when the intermediate parts of the
“ ellipsis are opposite to us. The vibrations
“ of the two organ-pipes may be compared to
“ NONIUS’S rule ; the sound is lower when
“ they coincide, and less at the intermediate
“ times. But, as the sound of bells is the most
“ familiar of those sounds which have a con-
“ siderable battement, the vertiginous patients
“ who attend to the irritative circles of sounds
“ above described, generally compare it to
“ the noise of bells.”

It must be evident to every one that Dr. DARWIN, in the above passage, wanders considerably from the principal points of inquiry ; for it was surely unnecessary to enter into an elaborate discussion of the causes which occasion the undulation of external sounds, when all that he wanted was to prove, that, as the sound of a bell is most familiar to us, vertiginous

ginous patients referred the noise in their ears to it. The causes which produce this peculiar noise in the ears, and which is referred to the sound of a bell, he does not inquire into.

The external, exciting causes of vertigo, are various, and of various origin; some are entirely mental. A person who is but slightly acquainted with any subject which requires a constant and powerful attention to be understood, shall become vertiginous from hearing another person speak too quickly on the subject. I know a lady of a very delicate frame, and of very excellent natural powers of mind, but not much accustomed to abstract thought, who, if she hears a long chain of reasoning, quickly delivered, constantly becomes vertiginous. In such cases, the attention is powerfully exerted at first, in order to apprehend, distinctly, every thing that is said; and the thought not being familiar, there is an effort to retain each of the ideas as they are delivered; while, on the other hand, the volubility of the person speaking presses new ones on her mind, before she can dismiss those she was examining.

In

In this manner attention is at last so far weakened as to act irregularly, and the ideas are then crowded involuntarily on the mind, and a momentary giddiness, and abolition of thought follows. As vertigo is often a mere symptom of apoplexy, epilepsy, syncope, and hysteria, it is evident that its causes may be nearly as various and numerous, as those which give birth to these diseases. Many of them are to be sought for in the stomach and intestines; wind suddenly distending that organ; indigestion, food remaining too long in it, and any error in diet, either in regard to quantity or quality. This is the reason why hypochondriac and hysterical women are subject to vertigo; worms in the intestines also occasion it.

The way in which corporeal causes may be supposed to act is this: the nervous impressions being of an unusual and powerful kind, prevent the action of impressions *ab externo*: the principle of association is interrupted by the obscure corporeal impressions alluded to, and hence there is an irregular flow of ideas,
and

and an irregular action of attention; but this being once accomplished, it is exactly the same as if a new series of representations and thoughts presented themselves involuntarily, rapidly, and in a confused manner to the mind.

Women are much more liable to this disease than men; and old people of both sexes are oftener affected with it than the young or middle aged. Women who are exhausted, from giving suck too long, or who are too weak to support the waste of fluids occasioned by it; people weakened by excessive evacuations, or hæmorrhages; and young people addicted to the destructive practice of self-pollution, are peculiarly subject to this disorder. Dr. HERZ tells us that he once had the medical treatment of a young man, who in consequence of this baneful habit had induced such a morbid sensibility of nerves, that he could not hear any person speak with a moderate degree of quickness, for any length of time, without being affected with vertigo. P. 329.

Independent of these diseases, mental perception is often altered from its natural state
by

by various disorders of the organs of external sense ; for if impressions *ab externo*, are altered in their passage to the brain, a new character is given to the representation of the mind. If, for instance, by any accident, a person becomes incapable of directing his eyes to any object, as he was formerly wont to do, the mind receives the impressions of the two eyes as two new impressions, and each, therefore, makes a representation, and the person consequently sees double. Those whose organ of sight is so constructed that they cannot see distant objects distinctly, necessarily lose a number of perceptions, which other people who see more acutely would receive from such objects ; and in this respect the faculty may be said to be defective : tinnitus aurium, or noise in the ears, diseases of the sense of touch, of taste, and smell, as they give rise to unusual impressions, may also become the causes of diseased perception.

CHAPTER IV.

ON MEMORY, AND THE ASSOCIATION OF IDEAS,
AND THEIR DISEASES.

*Memory defined. Difference between recognition and recollection. The value and meaning of other terms examined. Recollection dependent on association of ideas. The principles of association which have been ascertained by Mr. HUME taken notice of. The criticisms of LORD KAIMES, Dr. GERARD, and Mr. STEWART, stated and criticised. The Abbé CONDILLAC mentions a principle of association unobserved by Mr. HUME. Memory affected by corporeal causes. How this is to be explained. Objects of memory. HAL-
LER'S hypothesis of memory. Mr. LOCKE'S opinion, and that of Mr. HOOK, stated and examined. The difference of memory in different individuals. Instances of uncommonly quick and retentive memory. What the causes are which strengthen this faculty. Memory may be im-
paired, and abolished by a great number of causes. The causes mentioned, and methodically arranged.*

VOL. I. Z Cases

*Cases brought forward to elucidate their effects.
A peculiar species of vesania depending on the
principles of association, described and explained.*

THE word memory denotes that faculty by which ideas are retained in the mind, independent of the cause which first produced them. There are two ways in which it exhibits its influence and properties. The one is a very passive act in comparison with the other. It is called *recognition*, a word derived from the Latin expression *recognoscor*. By its means we are made conscious that objects, either of thought, or of external sense, which are accidentally renewed, have formerly been present to our mind or senses. As, for instance, when a person hears an anecdote which he has formerly heard, or meets a person he has often met before, he then becomes immediately conscious that he had a prior knowledge of them.

The other is a very active process, which consists in an effort to recal a former perception,

tion, part of which only is present to our mind, as, for instance, when a person is desired to recollect all the particulars of a conversation he had with another some time back; or when a person is asked what the contents of any book, or essay are, &c. When this process goes on easily, we are seldom conscious of the voluntary exertion we make use of on such occasions; but when the things are recollected slowly, and with difficulty, as we call it, we are all conscious of it. Indeed the exertion, or effort, often produces, when long continued, a very unpleasant sensation about the forehead, which sometimes terminates in head-ach. This active process of the mind has been denominated reminiscence by Dr. REID, and others; but HARRIS calls it recollection. The latter term ought to be preferred, because it is evidently derived from the English verb to recollect, which is in daily use to express the action of this faculty of the mind; whereas we have no verb related in a similar manner to reminiscence, for the verb to remember is applied indiscriminately both to the active and passive operations of memory.

The act of *recollection* is intirely dependent on the affociation of ideas. In order to recollect any thing, one link of the chain of ideas connected with it must be presented to the mind. Suppose a person is asked where he was at such an hour, on such a day ; the name of the hour and day contained in the question are ideas affociated in his mind with a vast variety of events, many of which must be recollected before he can give an explicit answer to the question. If any thing happened at the time which made a strong impresson on his mind, that circumstance is immediately recollected as soon as the day and hour are mentioned ; but if this is not the case, the person will probably be under the necessity of recollecting all that he did from the time when his daily avocations began, until that hour, and also many things he did after it, before he can exactly remember the particular event alluded to. He may also be obliged to recal to mind what he did at a similar hour for some days, both before and after the one mentioned.

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The doctrine of the association of ideas is at present so generally admitted by all philosophers, that it is deemed unnecessary in this work to employ much time in illustrating the fact; but, as the subject is intimately connected with that of memory, and as there are one or two physiological facts concerning it, which the medical student ought to be acquainted with, these shall be taken notice of and dismissed, in order to avoid interruption afterwards.

Whoever will patiently examine what goes forward within himself, during various acts of recollection, will be convinced that the ideas which are associated together in his mind, are not all connected in a similar manner. Some appear to be connected because they happened to make an impression on one or more of his senses, at, or nearly at, the same time. Thus, when we think of any fine picture, which once strongly engaged our attention, we recollect the most of its various parts, the particular view, or action, that was represented; the mode of assemblage, among the figures,

figures, their form, their size, their colouring, and the general effect the picture produced on our imagination, with the judgment we formed of it, the painter who painted it, the place where we saw it, and those who were with us at the time. In other instances the principle by which the association of our ideas seems to us to have been regulated, is the relationship which we imagine exists between a cause and effect. We cannot see an instrument of punishment without thinking of the pain it inflicts ; if a sudden light strikes our eyes, we look around for a luminous body ; if we see a flash of lightning, we expect to hear thunder.

The very celebrated Mr. HUME has endeavoured to reduce all the principles of association under three heads, *resemblance*, *contiguity*, in time and place, and *cause* and *effect* ; but Lord KAIMES in his Elements of Criticism, and Dr. GERARD in his Essay on Genius, Dr. Campbell in his Philosophy of Rhetoric, and Mr. STEWART, in his Philosophy of the Human Mind, think that there must be other principles of association admitted than these,
and

and they consequently assert that Mr. HUME has generalized the subject too much. The instances, however, of particular associations, which they adduce in support of their criticism, are extremely scanty. The compiler of the article Metaphysics, in the Encyclopedia Britannica, who is also of opinion that Mr. HUME has not mentioned all the causes by which the association of ideas is regulated, has condensed the arguments employed by the authors just now mentioned; and he states in a few words all the facts which seem to stand in opposition to Mr. HUME's opinion. After explaining this author's hypothesis, he says,

“ But surely ideas sometimes succeed each
“ other without *resemblance*, without *contiguity*
“ in time or place, and without being con-
“ nected by the relation of a *cause* to its *effect*.
“ Besides all this, there are other associations
“ than those of *ideas*. Ideas are associated
“ with passions, and emotions, and passions
“ and emotions are associated together. A
“ particular idea is associated with a proper
“ name, and often with the general name of
“ the species. General conceptions, such as
“ those

“ those which Mr. LOCKE calls mixed modes,
“ are associated with signs both audible and
“ visible, and signs are associated with each
“ other. Surely virtue, as it consists in action
“ and intention, does not resemble the *sound*
“ virtue, is not *contiguous* to it in time or
“ place, and is neither its *cause* nor its *effect* ;
“ nor is it conceivable that the arbitrary signs
“ of different things should have any natural
“ relation to one another.” Vol. XI. part 2.
p. 513.

These objections, when duly considered, will be found to have infinitely more apparent than real force. It is to be remarked, in the first place, that Mr. HUME confines his observations to the association of ideas alone, and as it is probable that he saw in a clearer light than what his critics seem to have done, that the association which takes place between many passions, and between passions and emotion, was of a very different nature from that which takes place between ideas, he very judiciously took no notice of them. These curious phenomena in our system depend on principles
very

very different from those which regulate our ideas. Every passion has its emotions, as every disease has its symptoms. The relationship which exists between them is similar to the general one of a cause producing its peculiar effect. If an emotion follows a passion, or accompanies it, it does not do so on the principle of an association, but on one which resembles the motion of a body when impelled by another; but this matter must, at present, be laid aside, as it is out of order. In the chapter which treats of the passions in general, it shall be more fully explained.

The next objection, that the association of ideas and passions may be considered as a proof that Mr. HUME has generalized too much, is subject to nearly the same remarks. The word passion is often indiscriminately applied, not only to the motives, but also to the actions of an impassioned man. When we see a person become disturbed in his whole frame, and direct offensive expressions against another; when we see him clench his hands, and, as if impelled by some irresistible power, commit
acts

acts equally unreasonable and injurious, we say that man is agitated with anger. In saying so we allude both to the state of his mind, and also that of his body. If Mr. HUME's critics refer to the association between the ideas and the bodily actions, as there is some reason to think they do, seeing that they also consider the association between ideas and words, (which are bodily actions) as an objection to his hypothesis, they would have done well to have examined this matter a little more narrowly, before they had published such a thought. All ideas which are followed by voluntary actions, produce their effect by exciting a peculiar principle called volition. The impulses of this, according as they are directed to particular sets of nerves, are transmitted along them, and when they reach the muscular parts, throw them into action, as many other physical causes do. Surely, then, there is no similarity between this chain of causes and events, and that which associates ideas together in our mind: one might as well have expected that Mr. HUME should have explained, by the principles he has laid down, the association between a flash
of

of lightning, and the noise of thunder ; between the throwing a stone up in the air, and its descending to the earth ; as the association between words and their external signs, or between the motives of any passion, and the actions of the same. If Lord KAIMES, Mr. CAMPBELL, and Mr. STEWART, allude to the association which takes place in the ideas that excite a passion, and those which urge a person to commit certain actions, the allusion is just and pertinent ; but this does not seem to be what they have meant, for the greater the number of cases of this kind which are examined, the stronger will the proof be in favour of the ingenuity and truth of Mr. HUME's remarks. Suppose, in the case already mentioned, that the person's anger had been excited by some opprobrious epithet having been applied to him ; the question, then, is whether the train of ideas, which follows that word in his mind, is, or is not, an exception to those general rules of association which Mr. HUME has endeavoured to establish. I will venture to assert that in every case in which a passion, (no matter of what kind it be) is excited by a word, the

the ideas which pass through the impassioned person's mind are all associated, in the first instance, on the principle of *contiguity* of time, except that word be cavilled with, as applied to time ; for quantities of time can only be in succession, not in contiguity, like space ; but putting the impropriety of the expression aside, it will be found that no words, or epithet, calculated to excite passion, can be employed, which will not bring into the mind the ideas we have been taught to associate with them. If a person is roused to anger by being called a scoundrel, it is not from any specific virtue in the sound of this word, but because he has formerly been taught what that word means. He has been told in early youth, that it is one which reflects on his character, not only as a moral agent, but as a man of honour ; if he does not understand these expressions ; they also are explained to him. He is made to comprehend, that, if such an epithet be publicly applied to him, it must affect his dearest interests in society ; and he is further taught, that no man ought to receive it without resent-

ing

ing it. These thoughts are associated in his mind on the same principle that a man recollects the various parts of a play which he has seen or heard, or the various objects which he saw on a journey. They follow each other in a regular succession at the time they are presented to his mind, and are united by the attention paid to them at that time. When one arises they all arise, except some casual occurrence breaks the connection. The ideas, therefore, which arise in an angry man's mind, are all associated, in the first place, on the principle of "*contiguity of time.*"

All the principles of association already mentioned, are accidental, and may be called natural ones. There is another, however, which arises from an act of volition, and which Mr. HUME, and his critics, do not seem to have taken notice of, and which may be called an artificial one. In the fourth volume of the *Cours d'Etude* of the celebrated Abbé CONDILLAC, entitled *l'Art de Penser*, this principle of association is merely stated as one which is different from the accidental ones; and although

though he enters into a full inquiry concerning the nature and influence of these in that masterly manner which is peculiar to him, yet he leaves the other unexamined.

Although by the laws of association already mentioned, perceptions which have been received at the same time, and those which followed each other in a regular succession, are generally connected in our mind, yet it would appear that we often detach a perception, or idea, from these alliances, and give it a place either among an old assemblage of ideas, or with a new combination of them. The power we possess of thus separating any idea from its ancient allies, as it were, and giving it a new place, is referred to a faculty called *abstraction*, which is the architect of all scientific arrangement, and one of the parents of original genius. When a scientific fact is accidentally mentioned, or read of, it is withdrawn from the extraneous matter with which it is associated in time and place, and is classed by the man of study among those ideas in his mind, to which it is scientifically related. If in the mixed conversation

fation which takes place in large societies, the historian, the astronomer, or the naturalist, hear of any fact, or facts, which regard their peculiar studies, do they not endeavour to associate them in their minds with others belonging to the same branch of study rather than with the conversation which either preceded, or followed it? It is on this principle that a person often in the course of general reading, and general conversation, acquires useful additions to many of the branches of knowledge with which he is acquainted. Again; by a voluntary effort we often detach old perceptions from those with which they were originally combined; and by giving them new situations, we form new modifications of thought. This is the other parent of genius, and of the art of composition. It will come again under our review, and will then be paid more attention to than what can be done at present. It must be evident that whether we separate any thought from those which are accidentally connected with it in discourse, or in writing, and give it a scientific association; or whether we detach an old one from those with which it was

was formerly classed, and do the same thing with it, that this new association which takes place is very different from any of those which fall under the influence of the principles laid down by Mr. HUME.

Enough has been said concerning the association of ideas to prove its existence and influence; we return, therefore, to consider the nature of memory.

Many are of opinion that this faculty depends on a mechanical property of the brain. They think that the impressions which external bodies make on our senses, leave a vestige in the brain, and that these marks, or vestiges, are the objects of memory. Baron de HALLER, in his Physiology, declares himself to be of this opinion, in words which cannot be misunderstood. “Eas mutationes in sensorio
“conservatas *ideas* multi, nos vestigia rerum
“vocabemus, quæ non in mente sed in ipso
“corpore, et in medulla quidem cerebri infabili modo incredibiliter *minutis notis* et copia infinita inscriptæ sunt.” Although the celebrated

celebrated Mr. LOCKE generally expresses himself in figurative terms when explaining psychological facts, yet in his Theory of Memory he also seems decidedly to have been of opinion, that the impressions of external objects made mechanical marks on the brain. "There seems," he says, "a constant decay of all our ideas, even of those that are struck deepest. The pictures drawn in our mind are laid in fading colours. Whether the *temper of the brain makes this difference, that in some it retains the characters drawn on it like marble, in other like free-stone, and in others little better than in sand*, I shall not inquire."

Dr. ROBERT HOOK, one of the first instructors of the Royal Society, and a most ingenious man, entertained a similar opinion concerning memory. Indeed he goes a great deal farther than LOCKE or HALLER, for he endeavours to tell us how they are formed in the brain, and how many hundred can be fabricated in a day.

By these hypotheses we are to suppose that a kind of figure, image, or picture, of every body which affects our external senses, is impressed, as it were, on the brain, where it remains, and constitutes an idea, and becomes an object of memory. Concerning that part of the brain which receives this indelible mark, there is a variety of opinions. Some think it is in the center, others in the cerebellum, and others think the whole brain is capable of becoming the seat of ideas. Although there is much diversity of sentiment in regard to this subject, yet there is one reflection in which all must coincide, which is, that all external objects which affect any one sense, must leave their vestige on the same spot, and this must have some correspondence with the origin of the nerves which supply that sense. All sounds, for instance, must make their impressions at the origin of that portion of the auditory nerve called *portio mollis*. But is it consistent with reason to imagine that some thousands of different sounds should each of them leave a distinct mechanical trace on so small a portion of medullary matter? But this is
not

not the first difficulty; a greater one is to comprehend how every succeeding impression does not destroy the mechanical vestige of the first, seeing that all the impressions conveyed by any one nerve, must fall on one point. Suppose a person attends a concert of music twice a week, for six months, and during the rest of the time is as much engaged in conversation as the generality of idle men are, how many millions of vestiges must be imprinted on that part of such a man's brain which corresponds with the auditory nerve. Of these millions he recollects some thousands, for every word has a distinct sound; and if he be acquainted with two or three modern languages, he may have often heard two or three sounds for every word. All these are to make mechanical marks at the extremity of the *portio mollis* of the nerve alluded to! Independently of these, the optic nerves, and nerves of the skin, are also conveying thousands of impressions, which can be recollected. One would imagine that however minute each vestige was, yet as it is asserted to be a mechanical derangement of some of the particles

of the brain, some difference would be observed between the brain of a man of learning, and that of a very ignorant man. But no such thing is to be seen.

Every one who reflects with attention on what goes forward in his own mind, must be conscious that those affections which are called mental perceptions, are the objects of memory. We are naturally inclined to believe that mental perceptions may exist in the mind after the nervous impressions, which gave rise to them, cease to act. But we certainly are not authorised to draw such a conclusion. To assert this concerning mind, presupposes such an intimate acquaintance with it, as we know from experience no human being possesses ; and yet it seems contradictory to human reason to believe that a mental perception ceases to exist, or to be any thing except at the moment it is excited, or renewed, which must be the case if that position be true. Although the knowledge we have of the brain and its properties forbid us to believe that it is the seat of memory, or that perceptions are vestiges which
remain

remain in it; yet there is no reason why we should suppose that that something, called mind, which I have endeavoured to prove is totally distinct from brain, should not have the faculty of retaining perceptions, whatever these are. If they were not somehow retained, it would be difficult to explain how we could distinguish the recollection of any thing from the first impression of it.

Those who explain memory on the mechanical principle of vestiges made in the brain, flatter themselves that this doctrine is corroborated by the well-known facts, that its powers are altered, and often totally destroyed by bodily diseases. Memory is impaired in almost all febrile diseases whatever, and WEPFER mentions many cases of a similar effect from hæmorrhages. Every physician of any experience must have observed how much the powers of memory are diminished in palsy, and after apoplexy. It often becomes extremely defective also in very old age. On the other hand, patients who have lost their memory after fevers, for the most part gradually

ally recover it as their health returns. In many cases of hysteria, stomachic complaints, and chronic weakness, in which the memory has been impaired, strengthening, or tonic medicines, as they are called, often give it its pristine powers ; hence the use of cold bathing, valerian, bark, moderate exercise, and country air, in such cases as these. Now it is said that all such instances evidently prove that memory is a mere corporeal affection, seeing that it is impaired, and renovated by physical causes. This, however, is neither a fair logical deduction, or necessary consequence from such premises.

The phenomena of memory, like those of all the other faculties, require a healthy state of brain, in order to become conspicuous. Each idea as it is renewed, excites the sensorial impression, or impressions, which gave birth to it ; but if the brain is not in a state fit to undergo this kind of change, it is evident that all signs of memory must fail ; for through the brain and nerves alone can these impressions be transmitted to the organs of speech,

speech, which are stimulated by these nervous impressions to the utterance of those words, or sounds, which in our infancy we were accustomed to associate with our ideas. The reason why a person, after fevers, and after palsy and apoplexy, therefore, has his memory often impaired, and sometimes abolished, is because the brain is so disorganized as not to receive impressions either from the mind, or from the external senses, in the healthy manner it formerly did. It does not, therefore, follow that our ideas are retained in the brain in a mechanical manner. Such facts only prove that the ideas, when they are renewed in the mind, do not produce their sensorial effect.

As to the uses of this faculty, they are as evident, and universally acknowledged to be highly important. Memory is the storehouse of all our knowledge, in which are accumulated every variety of thought which can either ennoble or debase man. His language, his science, his moral doctrines, and the tenets of his religion, the good and bad actions of his life; his attachments and endearments; his
cares,

cares, and causes of anxiety ; the vicissitudes of fortune he has experienced ; the conceptions and plans he has formed, and their failure, or success, are all treasured up in this faculty. To memory we are indebted for many of our purest pleasures, and many of our most acute pains. The gay scenes of our youth, the good actions we have done ; the praises we have justly merited ; the endearments of friendship ; the prodigies of nature and art we have seen in distant lands, all these things when recollected in happy moments of ease and comfort, rekindle our imagination, and cause it to glow as it formerly did, when these pleasures were first experienced. In like manner the recollection of the evil actions of our past life inflict on us, afresh, the pains of repentance and remorse ; we cannot think without the most distressing sensations, of the acts of ingratitude which have been formerly shewn to us, or of the neglect and mortification we met with from those in whom we hoped to have found a benefactor, or friend ; the disappointments in our dearest wishes, the misfortunes of our friends, their absence, and
their

their death, are all remembrances which sink us in painful grief.

The power of memory is different in different individuals. In some it is not only quick, but also retentive to a very remarkable degree. The following instance of this kind of memory is related by a Mr. MOUCHART, in Vol. VII. of the Psychological Magazine. It is that of a blind girl, who lost her sight when very young, owing to the small-pox, which she had in a very dangerous manner.

“ The child,” says Mr. MOUCHART, “ soon
“ gave proofs of her being endowed with superior mental powers, especially that of
“ memory. When she went to school she required to have her lesson only once read
“ over to her, and then she knew it perfectly.
“ She could also at that period repeat the longest songs, although she only heard them
“ once.

“ She goes to church regularly, and upon
“ her return home can repeat the whole of the
“ sermon,

“ sermon, with all the different passages of
“ the bible which were quoted by the clergy-
“ man, and the various chapters and verses to
“ which he referred. Her memory is equally
“ retentive as it is quick. Her mother took
“ her once to Stutgard, to hear a celebrated
“ preacher, and after she returned home she
“ repeated the whole of the discourse. A
“ year afterward she was asked if she then re-
“ collected it, and to the astonishment of all
“ present she repeated the whole sermon al-
“ most in the same words in which it had
“ been delivered.”

As an appendix to this case may be mentioned that of the very remarkable JEDEDIAH BUXTON, for a full account of whom the reader is referred to the Gentleman's Magazine, for Feb. 1751.

This man was a common labourer, and lived at Elmton, near Chesterfield, in Derbyshire. He had received so little education that he could not write his own name, yet he had cultivated that kind of memory which is necessary

fary in arithmetic, in a most surprizing degree, being able to multiply, in his mind, with the greatest facility, five or six cyphers by full as many. He was asked by a Mr. HALLADAY how many square feet were contained in a field 423 yards long, and 383 broad. In less than two minutes he returned the proper answer. Upon being asked how many barley-corns it would take to measure eight miles, he answered in about one minute and a half, 1,520,640.

These questions, however, were easy ones in comparison with others, the solution of which sometimes occupied him a whole week or two.

Many other instances of uncommon memory are related by ancient writers. DRUSUS, it is said, could repeat the whole of HOMER; SALLUST knew the whole of DEMOSTHENES; MITHRIDATES could speak twenty-two languages; and CYRUS could name every soldier in his immense army.

The

The difference of memory in different individuals is so striking as to be a matter of common observation. Some are undoubtedly born with superior powers of this faculty in comparison with what others are. But in most people it may be improved and strengthened to a great degree. There are four causes which principally contribute to this :

1st. The degree of attention which a person gives to sensorial impressions, as well those which arise from external impressions, as those which arise from the operation of his mental faculties.

2dly. Frequent repetition of the same impression.

3dly. The artificial order which we give to our ideas.

4thly. Exercising the faculty itself frequently.

This

This is not the place to enter into a particular investigation of the influence of these causes, since it is evident it belongs more to the curative part than to the natural history of the faculty.

Having taken a view of the different phenomena of memory in its healthy state, it remains to speak of its pathology, or disordered state.

Memory may either be morbidly impaired, or it may be abolished. Almost all the causes which weaken memory are capable, if they continue to exert their influence on the body for a great length of time, or if very powerful, to abolish the operations of the faculty, either for a long or short while, according to circumstances.

These causes are either *mental*, or *corporeal*; the *mental* ones are two in number :

1. Habits of inattention.
2. Over-exertion of the faculty itself.

The

The *corporeal ones* are

1st. Topical, or general derangements of the brain, and cerebellum, as occasioned by

a. Blows and contusions.

b. Apoplexy.

c. Palsy.

d. The diseased arterial action, which takes place in various fevers.

e. The disorganization which occurs in old age.

2dly. Debility, as occasioned by

a. Certain poisons.

b. Excess of venery, and self-pollution.

c. Stomachic complaints, of various kinds, comprehended under the extensive titles of dyspepsia, aepsia, chronic weakness, &c.

d. Nervous disorders, and hysterical affections of various kinds.

Of

Of these causes, the whole of the first class of corporeal ones are so often producing their effect, that there cannot be a person of general reading, of moderate observation, or a physician of any extent of practice, who have not either been a witness of their influence, or at least have repeatedly read or heard of it. I shall, therefore, not take up time in inserting a great number of cases to prove these facts, but shall confine my observations to those which are either not common, or not well understood.

Of all kinds of memory, that which is necessary for intricate arithmetical calculation is perhaps the one that demands the most constant and powerful efforts of the faculty itself. Many calculators have been known to pass several days and nights without sleep, in consequence of having been previously engaged with the solution of some intricate question. This is a clear proof that the action of the vessels which supply the brain have been excited to a preternaturally increased action; and a stronger proof of the same kind is, that there
are

are cases related of such men becoming delirious from similar causes.

In other cases it would appear that the great excitement which is produced by an overstraining of the faculty, is followed by an exhaustion of the sensorial, or nervous principle, and consequently the mind cannot act on it, and the memory seems to be greatly impaired.

There is a very curious case of sudden failure of memory from the too long continued use of the faculty. It is mentioned in Vol. VII. of the Psychological Magazine. It states that a man, of rather weak intellects, who held an office, the sole duty of which consisted in signing his own name to a number of papers, had one day so much business to do, that he at last was incapable of recollecting the word he ought to sign. It seemed to him as if he had totally forgotten it. Almost all his friends disbelieved the assertion; "Yet," says Mr. VAN GOENS, (a gentleman of great respectability, and well known in Germany, who relates the case,) "I am apt to think it was not more impossible

impossible or extraordinary than it appeared to be to the person himself. In justification of this remark, he mentions a case much more remarkable than the one just now taken notice of. He adds, that the truth of the anecdote may be relied on.

“ Mr. VON B——, formerly Envoy to
 “ Madrid, and afterwards to Petersburg, a
 “ man of a serious turn of mind, yet by no
 “ means hypochondriacal, went out one
 “ morning to pay a number of visits.

“ Among other houses at which he called,
 “ there was one where he suspected the ser-
 “ vants did not know him, and where he,
 “ consequently, was under the necessity of giv-
 “ ing in his name, but this very name he had,
 “ at that moment, entirely forgotten. Turning
 “ round immediately to a gentleman who ac-
 “ companied him, he said, with much earnest-
 “ ness, ‘ For God’s sake, tell me who I am.’
 “ The question excited laughter, but as Mr.
 “ VON B—— insisted on being answered, add-
 “ ing that he had intirely forgotten his own
 Vol. I. B b “ name,

“ name, he was told it, upon which he
“ finished his visit.”

Mr. VAN GOENS says, that the gentleman who accompanied Mr. VON B—— was the person who related the fact to him.

THUCYDIDES asserts that during the plague which raged at Athens, many who recovered from that dreadful malady lost their memory so completely, that they not only forgot the names of their friends and relations, but also their own names.

Several cases of loss of memory from fevers of various kinds, will be found in SHENKIUS, *Obs. Med. Lib. I.*

In BOERHAAVE'S *Prælectiones Academicæ in Instit. Med. ex Edit. Halleri*, Vol. IV. p. 463, we find the case of a Spanish tragic author related, who had composed many excellent pieces, and who in consequence of an acute fever, so completely lost all memory, that he forgot not only the languages he had formerly learnt,

learnt, but even the alphabet, and was therefore under the necessity of beginning his studies again. His own poems and compositions were shewn to him, but it was impossible to convince him that they were of his production. He afterwards, however, began again to compose verses, which had so striking a resemblance to his former writings, that he at last became convinced of his having been the author of them.

There is a very singular defect of memory, of which I myself have seen two remarkable instances. It ought rather to be considered as a defect of that principle, by which ideas, and their proper expressions, are associated, than of memory; for it consists in this, that the person, although he has a distinct notion of what he means to say, cannot pronounce the words which ought to characterize his thoughts. The first case of this kind which occurred to me in practice, was that of an attorney, much respected for his integrity and talents, but who had many sad failings, to which our physical nature too often subjects

us. Although nearly in his 70th year, and married to an amiable lady, much younger than himself, he kept a mistress whom he was in the habits of visiting every evening. The arms of Venus are not wielded with impunity at the age of 70. He was suddenly seized with a great prostration of strength, giddiness, forgetfulness, insensibility to all concerns of life, and every symptom of approaching fatuity. His forgetfulness was of the kind alluded to. When he wished to ask for any thing, he constantly made use of some inappropriate term. Instead of asking for a piece of bread, he would probably ask for his boots; but if these were brought, he knew they did not correspond with the idea he had of the thing he wished to have, and was therefore angry; yet he would still demand some of his boots, or shoes, meaning bread. If he wanted a tumbler to drink out of, it was a thousand to one he did not call for a certain chamber utensil; and if it was the said utensil he wanted, he would call it a tumbler, or a dish. He evidently was conscious that he pronounced wrong words, for when the proper expressions were

were spoken by another person, and he was asked if it was not such a thing he wanted, he always seemed aware of his mistake, and corrected himself by adopting the appropriate expression. This gentleman was cured of his complaint by large doses of valerian, and other proper medicines.

For some time I considered this as a very rare case ; but a few years afterwards I met with another, which came on in consequence of a paralytic affection ; and other instances of it are to be met with in the writings of different medical men. In Vol. VII. of the Psychological Magazine, professor GRUNER, of Jena, relates the history of a learned friend of his, whose memory was affected in a manner very similar to that which has been mentioned.

“ After his recovery from an acute fever, one
“ of the first things he desired to have was
“ coffee, (*kaffee*) but instead of pronouncing
“ the letter *f*, he substituted in its place a *z*,
“ and, therefore, asked for a cat, (*kazze*.)
“ In every word which had an *f* he committed
“ a similar mistake, substituting a *z* for it.

Mr. VAN

Mr. VAN GOENS, whose name has already been mentioned in this chapter, says, that the wife of Mr. HENNERT, professor of Mathematics, at Utrecht, who, like her husband, was also a mathematician, and astronomer, was affected with a defect of memory, nearly allied to that of the attorney already mentioned.

When she wished to ask for a chair, she asked for a table, and when she wanted a book, she demanded a glass. But what was singular in her case, was, that when the proper expression of her thought was mentioned to her, she could not pronounce it.

She was angry if people brought her the thing she had named, instead of the thing she desired. Sometimes she herself discovered that she had given a wrong name to her thoughts. This complaint continued several months, after which she gradually recovered the right use of her recollection. It was only in this particular point that her memory seemed to be defective, for Mr. VAN GOENS assures us that she conducted her household matters with

with as much regularity as she ever had done, and that she used to shew her husband the situation of the heavens on a map, with as much accuracy as when she was in perfect health.

Psychol. Mag. Vol. VII. part 3, page 73.

The following case may also be considered as a modification of the same complaint.

“ A man, aged 70, was seized about the
“ beginning of January, with a kind of cramp
“ in the muscles of the mouth, accompanied
“ with a sense of tickling all over the surface
“ of the body, as if ants were creeping on it.
“ On the 20th of the same month, after hav-
“ ing experienced an attack of giddiness, and
“ confusion of ideas, a remarkable alteration
“ in his speech was observed to have taken
“ place. He articulated easily and fluently;
“ but made use of strange words which no-
“ body understood. The number of these
“ does not at present seem to be great, but
“ they are frequently repeated. Some of
“ them he seems to forget intirely, and then
“ new ones are formed. When he speaks
“ quick,

“ quick, he sometimes pronounces numbers,
“ and now and then he employs common
“ words in their proper sense. He is con-
“ scious that he speaks nonsense. What he
“ writes is equally faulty with what he speaks.
“ He cannot write his name. The words he
“ writes are those he speaks, and they are al-
“ ways written conformably to his manner of
“ pronouncing them. He cannot read, and
“ yet many external objects seem to awaken in
“ him the idea of their presence.” GESNER’S
*Entdeckungen der neuesten Zeit in der Arzneige-
lehrheit.*

That great debility of body is a very com-
mon cause of a weak memory, every practi-
tioner in physic must be convinced. The
most ruinous kind, however, in its conse-
quences, in regard to the mind, is the odious
and baneful practice of onanism. This I have
often known carried to such excess, in both
sexes, as not only to bring on every symptom
of atrophy, but almost to destroy every active
operation of the human understanding. The
memory is, of all the faculties, the one which
suffers

suffers first, and in the highest degree; and it unfortunately happens, that when it has once been much weakened by such a cause, it is seldom ever perfectly recovered afterwards. TISSOT has already taken notice of the fact in his treatise on that vice, and has dwelt largely on it. To that book, therefore, the reader is referred, if he is desirous of having further information on the subject.

BONETUS mentions a case of a very great defect of memory, occasioned by that debility which accompanies the suppression of a certain periodical discharge in women. *Medicin. Septent. Lib. I. Sec. ix. cap. 2.*

IN WEPFER'S *Observ. Medico Practicæ*, Obs. 99. there is mentioned the case of a man of great note, who resided in the same city in which WEPFER lived. This gentleman lost his memory for a considerable time, in consequence of a profuse hæmorrhage. Various other cases of a similar nature are to be met with in the same work, and also in the *Medic. Septent.* of BONETUS.

It

It would be an easy matter to amplify this subject by the enumeration of more cases of defective memory which arise from causes similar to those that have been mentioned. But enough has been said on the subject.

It remains for us to turn our attention to the association of ideas, and observe what strange aberrations of mind, at times, arise from it. “The power of associating our
“ ideas,” says the celebrated Abbé CONDILLAC, “has its inconveniences, as well as its
“ advantages. To prove this, I suppose two
“ men, one of whom has never been capable
“ of connecting his ideas, and the other who
“ connects them with so much facility and
“ force that they become inseparable. The
“ first cannot have any imagination, or memory, and consequently cannot exercise any
“ of the faculties of his mind, which depend
“ on one or other of these. He is absolutely
“ incapable of reflection, and, in one word, is
“ a mere idiot, (un imbecille). The second,
“ on the contrary, must necessarily be endowed
“ with

“ with too much imagination, and memory ;
 “ and this excess is capable of producing full
 “ as bad effects as the entire privation of them.
 “ He would be incapable of reflection, and
 “ be absolutely a madman. *Il auroit à peine*
 “ *l'exercice de sa reflexion ; ce seroit un fou.* The
 “ ideas the most dissimilar being strongly con-
 “ nected in his mind, merely because they
 “ were presented at the same time, he would
 “ conceive them naturally allied to each other,
 “ and would make the one follow the other
 “ as a consequence follows the cause.”

Between these extremes, he adds, there may
 be supposed to be a just medium. This is a
 point of such difficult discovery, that the great-
 est geniuses seldom find it out. Accordingly
 as they approach the one extremity or the
 other, they naturally retire from it. “ Those
 “ who have too much memory, and imagina-
 “ tion, are deficient in many qualities which
 “ are necessary to a methodical, accurate, and
 “ solid understanding. Those who deviate
 “ in an opposite direction, lose all the quali-
 “ ties

“ ties which give charms to wit. The first
“ class write with most grace ; the second
“ with most depth.”

Were the train of ideas to be followed which this observation of CONDILLAC's gives rise to, an investigation of a most interesting nature might be instituted, concerning the influence of this principle in all kinds of composition, whether in poetry, or in prose, in wit, or in learning, or in the arts, and in science. But as the facts belonging to the natural history of the human intellects, which are to be brought forward in this work, must be solely directed to the elucidation of its morbid history, or pathology, this enticing tract of inquiry must be abandoned, and our eyes turned to a more melancholy, though, perhaps, more useful exposition of mental phenomena.

There is a species of insanity of so surprising a kind, that nothing but its frequency prevents us from regarding it with that astonishment which it is well calculated to excite :
a person

a person conducts himself like a man of sense, in every respect except in one particular circumstance ; but in that, his thoughts and actions are in such opposition to those of other men, that he appears to them to be evidently deranged. This is the *melancholia moria* of SAUVAGES. In many cases it is a species of hypochondriasis, arising from corporeal causes, as for instance, when a person erroneously believes any part of his frame to be altered from its natural form ; but in other cases it arises from mental causes. The judgment is generally naturally weak, or preternaturally debilitated by various circumstances, and then certain predominant affections and passions give birth to the diseased associations ; as when a person believes he is endowed with a prophetic spirit ; that he is the intimate companion of kings and princes ; that he ascends up to heaven, or descends to hell, &c.

As the insane idea of such people generally consists of certain combinations of thought, which experience does not yield, but are formed in the mind, either by diseased feelings,
or

or strong passions and desires, this malady appears to belong rather to the subject of imagination, than to this place; and as the history of its rise and progress cannot be fully considered until the nature of that faculty has been explained, we shall defer speaking of it till then.

Although we are indebted to the principle of association of ideas for all the benefits of knowledge and genius, yet it often becomes the source of much misery and distress, as well as of many false judgments, which, although not commonly considered as deliria, are no less aberrations from sound sense. When any accident or calamity happens to us, so as to excite some strong passion, every thing which afterwards brings it suddenly to our recollection, occasions nearly the same powerful emotions as happened at first. Suppose a person to have been much frightened, and hurt by some fierce animal, the sight of a similar one occurring at any period of life afterwards, will often excite violent alarm in the mind; even although the
animal

animal should be tame and secured. If the sight of a disagreeable, or disgusting object, has made the stomach revolt, so as to induce nausea and vomiting, the mentioning the name of the object at any time afterwards, will do the same thing. The antipathies and aversions which many people have for certain things, can only be explained on this principle. Of those who escaped from the earthquake at Lisbon, I formerly knew one gentleman, who, if he accidentally heard the word earthquake mentioned in company, became almost instantaneously delirious. BOILEAU, when a child, happened one day, when he was at play, to irritate a turkey-cock, to a prodigious degree. He accidentally fell backwards, and the enraged animal flew at him, and wounded him in such a delicate part, and in so ruinous a manner, as rendered him incapable of ever afterwards enjoying the advantages peculiar to his sex. WEICKARD, and several others, who mention this circumstance, ascribe to it the hatred which the poet afterwards shewed to women, and all who admired them ;
and

and to the Jesuits, who were supposed to be the first who introduced the Turkey fowl into Europe. *Philosophische Arzt.* B. I. bl. 7.

Upon the same principle, many associated ideas which are peculiar to certain countries, and which give rise to a number of usages and customs that appear unreasonable and cruel, and even barbarous to others, may be considered as national vesanix. Of this kind is the association of ideas which was taught the Romans, that it was much nobler to put a voluntary end to their existence than to outlive a disgrace ; of this kind is the associated ideas instilled into the tender mind of the female Hindoo, who believes that a voluntary sacrifice of her life, upon the death of her husband, is an infallible means of securing to herself everlasting happiness ; and the prevailing opinion among the men of the more civilized parts of Europe, that no reparation for certain insults can be otherwise procured than at the hazard of one's life, is of the same nature.

It

It must be evident to every person of reflection, that to follow this chain of thought would naturally lead to the examination of certain maxims and principles, derived from different forms of political and church government. But it must also appear that a proper boundary is here put to the researches of the author.

CHAPTER V.

ON JUDGMENT, AND ITS DEFECTS.

Classification of human judgments. Inquiry into the nature of judgment. Reason, what it is. In what degree brutes possess it. What things are to be considered as acts of judgment. A man is not mad because he thinks differently from the rest of mankind. Whether judgment is ever deranged in a madman. Of judgments as to future events. A species of curious prediction accounted for. Of the defects of judgment; classification of their causes. Erroneous judgments, to what they are to be referred.

THE common appellation given to this faculty is a term extremely proper, as far as it regards the mere result of the mental operations; since the examination of various perceptions, or subjects of thought, presented to the mind for the exercise of this faculty, always

ways terminates in a conclusion, or judgment, (*judicium*).

Few authors have treated fully of this faculty; and of those who have done so, not any one whose works have fallen into my hands, have taken it up as a mere object of natural history. They have defined it, and discussed something concerning its properties, in a very metaphysical way; but their definitions are generally faulty, and incorrect, and their speculations too refined for the physiologist. Instead of attempting to explain, at present, the nature of judgment, let us confine ourselves to the task of discovering and examining the various classes of ideas, which man, in sound mental health, is capable of comparing with one another. By this means we shall be enabled to find out what the intellectual character is which is common to them all.

1st. External objects, that is to say, the perceptions they excite, may be compared with each other, as, for instance, when a person is

C c 2

desired

desired to say which of any number of men appears to be the strongest, or tallest, or oldest, &c.

2dly. External bodies, and qualities of bodies, may be compared with certain pre-existing judgments and opinions, as in many matters of knowledge and taste; for instance, when a person is desired to give his opinion about a piece of architecture, a picture, a landscape, or a horse; in which case he compares the object before his eyes with the notions he has already acquired concerning the things to which it relates.

3dly. Abstract qualities, and prior judgments may be compared with each other, as, for instance, when ROUSSEAU decides that that which is commonly called civilization, and culture, do not promote the general happiness of mankind; and

Lastly, The comparison may take place between all those things already mentioned, and the conclusion, therefore, or judgment, has a relationship to the whole of them,
as

as is the case when a judge has to give an opinion in certain complicated cases of right or wrong, from a multiplicity of dead and living witnesses, and from the relationship which the result of their testimony has with former decisions, and the existing laws; or when a physician is desired to form an opinion as to the probable event of a dangerous disease, in which case not only all the phenomena present are to be duly weighed, and their causes considered, but these things must also be compared with the knowledge he has acquired concerning the various causes and appearance of death, and with the probable effect which he expects from the means he employs to oppose that event.

It is a curious, and certainly an obscure question, how the human mind should be able to compare the relationship of any two or more circumstances, since one subject of thought alone occupies our attention at one and the same moment of time. For if this be a fixed law of the human mind, (which, indeed, all the phenomena of thought tend to confirm)

then

then as soon as any one circumstance to be compared, has been succeeded by another, there ought to be no further perception of the qualities of the first one ; but how is it possible to compare the present thought with the one which preceded it, if we have no perception of its qualities ?

Every question demanding an act of judgment for its solution, requires not only the examination of the facts stated in it, but in every case it exacts a comparison of these facts with a certain pre-existing notion, which, although not expressed in the question, is always included in it. Let us take one of the most simple acts of comparison of perception to illustrate this position. Suppose a person is asked which of any number of men he would judge to be the heaviest. It is evident that in such a case the person must not only compare the men with each other, but also with the abstract notions which he has formed concerning the causes of weight. When a person is desired to say which of two horses he judges is the fleetest ; the person compares the peculiar
form

form of each horse with the abstract notion he has already acquired of the make which a very fleet horse ought to have ; and the horse which has the strongest relationship or similarity with that pre-existing thought is judged by him to be the swiftest. In doing this, the person is conscious that the objects, or thoughts to be examined, have different degrees of resemblance, or analogy with the abstract notion, and consequently he must be conscious that they have different degrees of dissimilarity among themselves. The judgment which he delivers is nothing else than an enunciation of this relationship. A judgment, therefore, is nothing else than a perception of the similarity, or dissimilarity of two or more ideas.

The mere process of comparing ideas is called judgment, and the faculty we are possessed of, which enables us to draw general conclusions from any number of comparisons, is commonly called reason. The analogy which exists between the two is obvious.

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This operation of mind is supposed to be peculiar to man, exalting him above all other created beings, becoming the source and support of his grandeur when duly exercised and cultivated, and the standard of his debasement when neglected, or subjugated by vice and passion.

Other animals as well as man have the power of comparing perceptions and thoughts, as is evident from their actions, which are often the result of such an examination; but there is every reason to believe that in them it is only exercised in regard to external and particular objects, and that they are incapable of forming any logical or general conclusions, or any abstract notions.

As reason is the faculty by which we deduce certain conclusions from the comparison of our ideas, it is evident what those things are which deserve to be considered as acts of this faculty. These are the investigation of truths, (taking it for granted that truth is to be found) the generalizing ideas, the rectification and
proper

proper application of language ; the application of general ideas (principles) to the improvement of science, or the regulating our own conduct, as standards by which the conduct of others is to be judged, the checking our passions, &c. ; all these things are properly considered by mankind at large, as acts of reason ; and when a man is deficient in any of them, he is said to think or act unreasonably, or to evince a want of solid understanding. It does not follow, however, that because a person thinks and acts differently, on a few points, from the majority of the world, that such a person acts unreasonably, or injudiciously ; for the principles which regulate his judgment, although different from those of other men, may be more correct than theirs, and when made known may command general assent.

The judgments we have formed from past events constitute a great part of our experience ; and as these have unfortunately not always been correct, they often act as causes which mislead us in our judgment of present
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and future events. The judgments we form as to the probable issue of distant events, has been considered by many as a distinct faculty, called the *faculty of foresight*, or *prediction*. As the subject is naturally allied to that which we have analyzed, it may be expected that it also should be subjected to examination.

All men possess this faculty in a certain degree; every man foretels that the sun will rise to-morrow, that the night will follow day. An experienced seaman foretels a change of weather, long before it happens; a wise and unimpassioned statesman can foresee the convulsions that will happen in states which are in apparent tranquillity, vigour, and power.

Although the last mentioned circumstances seem to be the effect of a prophetic spirit, when compared with the first, yet they both depend on the same principle. We have seen the sun set often, and regularly rise sometime afterwards; when, therefore, we see the sun set again, we judge it will again arise; we have no moral certainty that the event will
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take place, we only judge that it will do so, because we have often seen the same thing happen. The sailor who foretels a distant change of weather, does so because he has often seen such a change of weather preceded by the appearances which caused him to form this conclusion in his mind. The ruin of an empire is foretold in the same manner, but the prediction seems wonderful to the ignorant, because the facts on which the judgment is founded are not always evident to the multitude. They are to be sought for in the deep recesses, and records of ancient as well as modern times, in the spirit of the laws, in the temper of the rulers, and the disposition of the ruled.

The theory of such predictions as these is so clear as not to require any further elucidation. The person who predicts such events can always trace the circumstances which have led him to such a conclusion; but there are others, for which, however habituated he may be to reflect on the operations of his own mind, he can seldom give a satisfactory account.

count. One of the most common of these kinds of foresight is that wonderful presentiment which causes many men to announce their death, a considerable time previous to its taking place. No allusion is, at present, made to any preternatural warnings; of this, probably, hereafter. A person labouring under a mortal disease, and from whom the danger is carefully concealed, shall say to his physician "Sir! all your endeavours are in vain. I feel that I shall surely die of this complaint." The event is fulfilled in a few days afterwards.

The expression which the person employs evidently points out the proper mode of analyzing this kind of judgment, so as to arrive at the principles on which it is founded.

It has been remarked, that there are two very different classes of perceptions, the one distinct and clear, yielding us what we believe to be accurate representations of the objects from which they flow. The other is obscure, and gives us no kind of knowledge of the causes which produce the perceptions in our mind.

mind. The first is received from external objects, acting on our external senses ; the second is derived from impressions on the extremities of all the other nerves of the body, particularly those of the viscera, of the abdomen, and thorax. When treating of these subjects, the reasons were pointed out why impressions on the remote extremities of such nerves did not give a clear perception to the mind, and the ultimate end that was obtained by such a wise œconomy, was also hinted at.

The usual and ordinary impressions which are constantly taking place on the extremities of the nerves of the thorax, and abdomen, and all the other parts of our frame, except the external senses, do not, as has been already observed, produce any mental perception sufficient to engage our attention while the animal is in perfect health. No healthy person feels the food in his stomach, or the matters contained in his intestines, the blood which circulates through the whole of his body, or the gall in his gall-bladder, &c. But as soon as any organ, or set of organs, is deranged,

ranged, or the matters which ought to be applied to it, are much altered, then sensations arise which perhaps engage our attention the more strongly, inasmuch as from their obscurity we are always in doubt from what cause they proceed, or how they are to terminate. Many of these we have been accustomed to from our infancy, such as various kinds of pains and uneasinesses, sensations of weakness, increased heat, thirst, loss of appetite, quickened respiration, &c. These, except they happen to be in a very unusual degree, seldom awaken our fears, for the person trusting to his past experience, hopes they will again terminate in a return of health; but when any new sensation is felt, which affects us in a very uncommon manner, apprehension instantly arises in the human mind. Suppose a blood-vessel to give way in some internal part, as in the cavity of the abdomen: the person without being conscious of what has really happened, is at once alarmed by the uncommonness of the sensation, and when he finds this to be quickly succeeded by a dimness of sight, and sudden loss of his strength, his terrors instantly

stantly increase to the greatest possible degree. He in vain calls in the assistance of experience, and recollection, in order to judge what may happen ; and the ideas the most naturally associated with his fears, therefore, present themselves involuntarily to his imagination. Now the most alarming of all ideas which men in general have formed to themselves, is that of their own dissolution ; and as they know this is generally preceded by diseased feelings, the gradual sinking of their strength naturally excites this thought, and they announce their death.

The prediction of death naturally arises from the absence of those feelings which would lead us to expect a return of health. Three sets of causes particularly excite this alarm ; a consciousness, or feeling of an uncommon and increasing prostration of strength ; vertigo, and its attendant, loss of sight ; and, thirdly, whatever greatly impedes respiration. In almost every disease in which patients have predicted their own death, one or other of these symptoms occur. That their judgment is
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often erroneous, need not be mentioned ; but as it has been looked upon with wonder, when the fact has coincided with the prediction, I thought it might not be uninteresting to place the phenomenon in its proper light. To return to our subject.

Between clear and unclouded reason, and absolute insanity, there are many shades of greater or less deviation. To enumerate, or point out the distinction which exists between them is impossible. Language is not sufficiently copious and accurate to afford such a means. The causes of these deviations are numerous, and the whole subject, therefore, although very important to be known, is of difficult investigation.

In regard to the practice of physic, the distinctions which exist between the defect of judgment, or reason, are of much less consequence than their relation to the moral world, or their influence on society ; for judgment, considered as a faculty, has no peculiar disease. The conclusions which a person forms
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in his mind, may be erroneous, but the faculty of judging is the same in a madman, as in a man in perfect health. One would not say that a musician of Nootka Sound, or the South Sea islands, was less sane than an able and accomplished musician of this country, because he produced different combinations of sound. The muscles in the hands and arms, and the faculty of moving them, may be equally healthy in both. So it is in regard to lunatics, and men who are of sound mind. The faculty of judging is the same in both, but they have different perceptions, and their judgments, therefore, must be different. The madman has diseased nerves and brain, and diseased perceptions, and he is therefore obliged to draw conclusions which appear strange to a man in health. If a madman judges that he has the government of the whole world in his hands, and that the seasons are obedient to his command; that he can dry up the waters of the Ganges by a wish, or thaw the continents of ice which surround the poles; if he believes that he can make the produce of Italy spring up in the deserts of Arabia, or the climate of Arcadia

reign in Great Britain, he *judges* in this way because the perceptions which are present in his mind force him to draw such conclusions. The process of his intellectual faculties in this case, is equally correct as that which caused Sir ISAAC NEWTON to conclude from a number of facts that all bodies gravitate towards each other, for the intellectual part is the same in both, but the brain is diseased in the lunatic.

It is, doubtless, a true character of insanity when a man's judgment is under the influence of diseased perceptions, so that he cannot judge as the generality of men do. It would be a very injudicious application of philosophy, were a person in conversation to try to prove that a madman was not mad because he judged correctly about the objects of his thoughts.

The defects of judgment do not arise, then, from any fault in the faculty itself, but from the materials on which that faculty has to operate.

The deviations which these materials occasion are of two kinds :

1st.

1st. Incorrect judgments.

2dly. Erroneous judgments.

Incorrect judgments may arise,

A. From a want of sufficient facts, or materials.

B. From a too hasty examination of one or any number of them.

C. From not *recollecting* all the chain of analogies, or the different links of relation, by which the various parts of evidence, or facts, are connected with the general conclusion.

D. From the interference of matters of belief, prepossessions, prejudices, or passions.

1st. Every person, even of the soundest mind, is liable to incorrect judgment if he speaks on a subject with which he is not sufficiently acquainted, or if he attempt to give an opinion on a point which requires for its decision more facts than are laid before him;

for it is evident that the judgment in such cases is founded on a partial view of the subject, and many facts which are not examined may stand in opposition to the general conclusion, or judgment he forms. It is unnecessary to expatiate on this.

2dly. A too hasty examination of any number of facts, on which a question hinges, produces nearly the same effect as a want of sufficient evidence. The mind of every person requires to be habituated to dwell for a certain length of time on each fact which has any relation to the question, and which is consequently of use in forming a judgment. This habit is to be gained, in most cases, by education. The command of our thoughts must be obtained by habitual restraint, and coercion, in early life, if it be required that a person should excel in correct judgment. In many cases this is a trial of uncommon difficulty, both for the instructor and the instructed. There is a certain irritability of mind, if I may be allowed the expression, which it is hardly possible to restrain by common means ;
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and, unfortunately, the generality of parents, and of those intrusted with the education of youth, are seldom sufficiently acquainted with the varieties of mental character to discover this temperament when it prevails. It is most strong in those who have a mixture of the sanguine and choleric disposition. Those who are purely sanguineous, although they have it in a less degree than the former, are still very much under its influence; young people, when compared with those of a mature age, and women, when compared with men, may be said to be of the sanguine temperament; and hence people who have a mixture of the sanguine and choleric disposition, those of a purely sanguine temperament, and women and young people, are much more liable than the rest of the world to incorrect judgment.

3dly. It must be evident that judgment depends greatly on the goodness of memory. A person who forgets the *data* of any science, is constantly exposed to form incorrect conclusions concerning those parts of it which have any relation to the *data* which are forgotten.

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The necessity of a correct memory, in regard to judgment, cannot be better proved than by the obligation imposed on the judges of this country. In summing up evidence, in any cause, they are not permitted to trust to their memory alone. They must write down the facts which they draw from the witnesses, and which they are afterwards to recapitulate to the jury.

4thly. Among the frequent causes of incorrect judgment, the prepossessions, prejudices, and passions of men, are to be enumerated; for, in such cases, the various facts will be examined as much by their relation to the various desires and aversions which predominate in the mind, as by their relation to the general question. If a judge is prejudiced by political opinions in favour of certain usages, it will not be an easy matter for him to preserve himself pure in the court when cases come before him which regard such usages. He will prefer the bye-law of a corporation to the express statute of government, if it happens to coincide with his desires.

“ Omnis

“ Omnis homines qui de rebus dubiis con-
“ sultant ab odio, amicitia, ira, et misericor-
“ dia vacuos esse decet. Haud facile animus
“ verum providet, ubi illa officiunt, neque
“ quisquam omnium lubidini simul et usui
“ paruit. Ubi intenderis ingenium, valet ; si
“ libido possidet, ea dominatur, animus nihil
“ valet.” *Tiberii Orat. ap. SALLUST de Con-
juratione CATILINÆ.*

Erroneous judgments arise from diseases of the external senses, from diseases of the body, preventing the due agency of external objects ; from the causes which derange attention, mental perception, and memory ; and the faculty we possess of abstracting and compounding thoughts. They are therefore to be sought for in the preceding and succeeding chapters of this work.



